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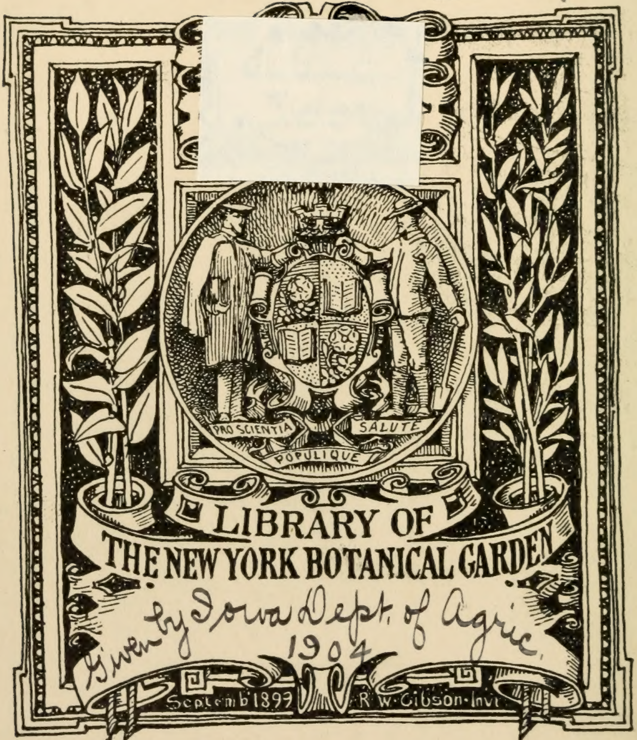
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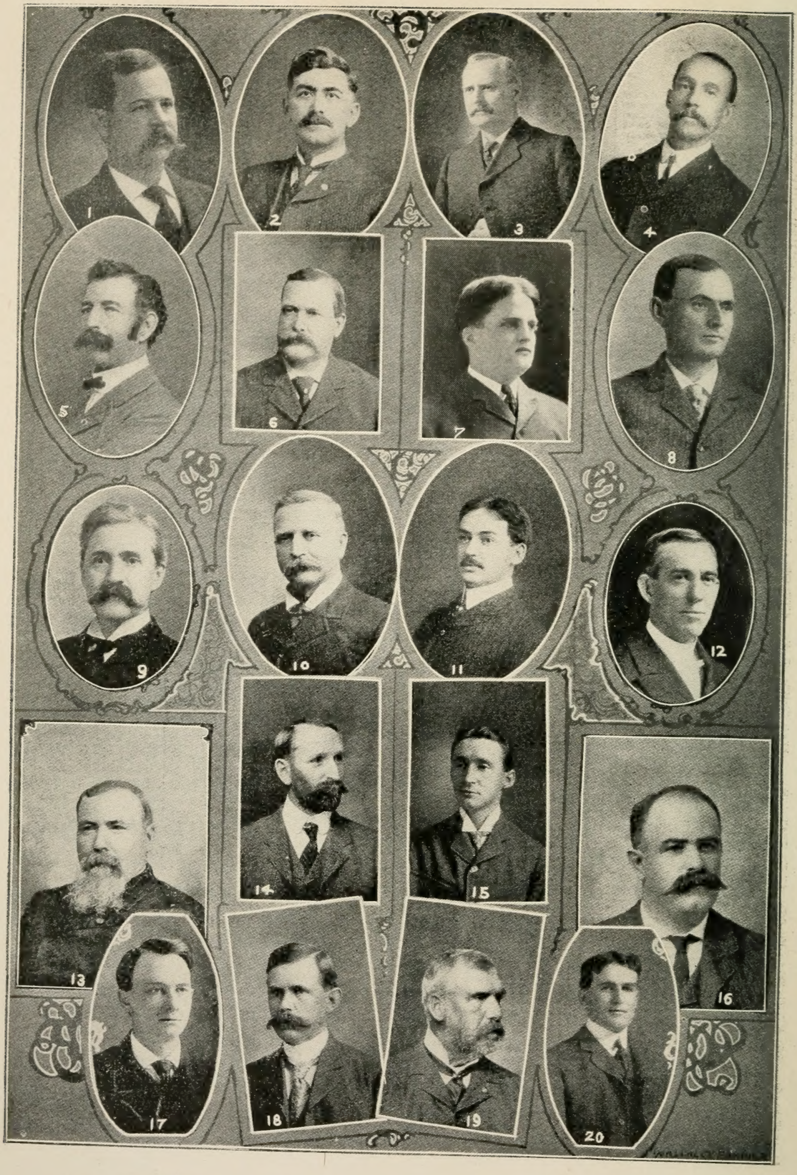

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THE

Iowa Year Book of Agriculture

4

ISSUED BY THE IOWA DEPARTMENT
OF AGRICULTURE

CONTAINING

PROCEEDINGS OF THE STATE FARMERS INSTITUTE OF 1903; SYNOPSIS OF
STATE BOARD AND COMMITTEE MEETINGS; WEATHER AND CROP REPORT;
PROCEEDINGS OF THE IOWA SWINE BREEDERS ASSOCIATION; EXTRACTS FROM THE DAIRY COMMISSIONER'S REPORT; PROCEEDINGS OF THE IOWA STATE DAIRY ASSOCIATION AND
NATIONAL DAIRY UNION

AND

PAPERS ON LIVE STOCK, AGRICULTURE AND POULTRY TOPICS

ALSO

PAPERS READ BEFORE FARMERS INSTITUTES; ARTICLES AND ILLUSTRATIONS
REGARDING THE IOWA STATE COLLEGE OF AGRICULTURE AND MECHANIC
ARTS; LAWS RELATING TO FARMING AND STOCK RAISING INDUSTRIES; EARLY HISTORY OF THE IOWA STATE FAIR

AND

REPORTS OF COUNTY AND DISTRICT AGRICULTURAL SOCIETIES

EDITED BY
J. C. SIMPSON,
SECRETARY STATE BOARD OF AGRICULTURE

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JUN 8 1904

LETTER OF TRANSMITTAL.

OFFICE OF
IOWA STATE DEPARTMENT OF AGRICULTURE,
CAPITOL BUILDING.

DES MOINES, IOWA, February 16, 1904.

To His Excellency, A. B. CUMMINS, Governor of Iowa:

I have the honor to transmit herewith the Fourth Annual IOWA YEAR BOOK OF AGRICULTURE, for the year 1903.

Very respectfully,
JOHN C. SIMPSON,
SECRETARY STATE BOARD OF AGRICULTURE.

PART I.

STATE FARMERS INSTITUTE.

AGRICULTURAL CONVENTION.—SYNOPSIS OF THE STATE BOARD AND COMMITTEE MEETINGS FOR 1903.

PROCEEDINGS OF THE ANNUAL MEETING OF THE STATE FARMERS' INSTITUTE HELD AT THE Y. M. C. A. AUDITORIUM, DES MOINES, IOWA, TUESDAY, DECEMBER 8, 1903.

The meeting was called to order by the president at 9:30 o'clock A.M.

THE PRESIDENT: The first subject on our program this morning is entitled, "Should the Institute Law be Changed," by Prof. C. F. Curtiss, of Ames.

REMARKS BY PROFESSOR CURTISS.

I presume, from the reading of the subject assigned me, it will be inferred that I think the institute law should be changed, or that I have changes to recommend. I wish to put your minds at rest on that subject, by stating at the outset, that I do not think any radical changes should be made in our present institute law. I believe it has some excellent features and that on the whole the institute is a good one. Perhaps, however, there are some respects in which the institute law, as we now have it, will be improved. I believe an improvement was made a year or two years ago, when the legislature provided that the institute should have representation in this annual meeting of the board of agriculture; I think that that step was one that will lead to good results. While this is the first meeting that has been held under the new plan, with an effort made to bring the institute workers together, I think. with an arrangement of this kind, if carried out, this system can be worked out in such a way that the institute workers can come together at these annual meetings and take part in a day's session devoted to institute work, and that it will be a very great help to the work in all parts of the State.

One difficulty was encountered in the arranging of this program, that was the fact that the law provides for holding annual meetings on Wednesday, and that sufficient time could not be found during the week preceding that date to arrange for a suitable program. It does not seem possible, from previous experience, to get a large attendance in here before Tuesday. A good many men come quite a distance, come from remote parts of the State, from where it is practically impossible to reach Des Moines before Monday evening or Tuesday morning; consequently the Monday meetings have never been largely attended, and one day preceding the board's meeting and the election of officers does not afford sufficient time for such a program as might be arranged and should be arranged to provide for this work to the best advantage.

It would seem, that under these conditions, the date of holding the annual meeting of the State Department of Agriculture might be changed to the day following, say to Thursday of the week. Of course, this date is fixed by law and could not be changed unless done so by the legislature; but if we could have this additional day for these meetings, to enable the officers to make provision for such a program as would meet the requirements, anw that these meetings, when arranged properly, ought to and will bring the leading institute workers, and those who take most active part in all questions together.

I know from experience, and every one knows from experience, who has attended these institutes, that some of the very best institute workers that can be found anywhere, are developed in localities where the work is purely local. Some of the very best institutes I have attended, in this or any other State, are institutes carried on by local help. These men are capable of imparting instruction and capable of formulating plans for institute work and are eminently successful.

This meeting should bring together that class of men, and it should bring together all men interested in advancing the agriculture of this State, and should develop into a sort of a school of instruction for the institute workers, at which men will get an inspiration, suggestions, ideas and plans which they can carry home and apply to their own institutes. That, I believe, is one feature in which our law can be improved. It is a matter of minor consequence, merely a matter of shifting a day one day ahead, to enable the officers to arrange such a program and such order of exercises as will bring more good out of these meetings.

I think that the present system of local management of our institutes is a strong one. I believe it is a system our people would not be willing to abandon under any circumstances. I think that it has some better features to it than any system of central management that puts the authority and power completely in one central organization. I think that a central organization would perhaps bring about more co-ordination of the institute work than we now have; but I believe in the democratic system of our institutes as they are now conducted. I have noticed this in other states, where they have a central organization.

The local communities there feel no responsibility; they feel that the institute is a State organization; that it is under the management and direction completely of this corps of institute workers, and those who attend will come in and sit down and feel no responsibility, and in a great many cases are but little interested. If the responsibility rests with the local men and the local people have control and they manage that institute, it is then their organization, their meeting, the responsibility is with them and they feel under the necessity of making it a success. They should have provisions by which they can get outside help, and that, of course, should be continued and strengthened. But I think no change in our institute law should be made that will take the management out of the hands of the local authorities. This system, where we have had the institute law in operation, that is, where we have the institutes in force, and where the institutes are regularly held, this system has developed, say in two thirds of our counties, the best institute meetings that have ever developed in any State. I believe communities get more good out of those institutes under the present system of local management than they do under any other system.

I think that the system we now have can be strengthened in the respect I have named. One criticism that has been urged against the present system is, that there is no plan by which the institutes can be held on consecutive days, and that is objectionable. There is a great loss of time on the part of speakers going from one institute to another. Now, if in addition to our present plan some system could be devised by which institutes in certain localities or congressional districts could be arranged in consecutive order, that would result in an ability to secure better service, better institute speakers, it would enable those who do institute work to attend institutes in various localities and to accomplish much more. I do not know just how that should be brought about—just what would be the best plan. Various methods have been suggested. I think it would be in order for this convention to take it up and consider it and endeavor to devise some plan by which it could be done. In connection with that, I may say that in some states an institute car has been arranged and the railroads have co-operated; in fact, I think they have borne a considerable part of the expense of fitting up a car and transporting it from one locality to another throughout the State, to meetings of a special nature and at regular institute sessions, and that plan has been suggested in this State. It has received some consideration. Whether anything of that kind may be brought about I can not say, but in case it should, you can see the difficulty in arranging for work of this kind without any co-ordination on the part of institute organizations. There should be, in case a plan of this kind were inaugurated, a series of consecutive institutes held in the same part of the State, so that that car and corps of institute workers, when called upon, could come to the assistance of the various institutes in consecutive order. That applies also to institute workers, as I have stated, who go from one institute to another.

Then, I think, there is another fact in which our institute system is somewhat defective. The lack of a central organization has resulted in the proceedings of the various institutes being wasted so far as their neighbors were concerned, or so far as the people of the State were concerned. No plan under the present system, has been devised for collecting and bringing together and putting in printed form the best things that are given at these various institutes. A great deal of valuable information is presented year after year in the institutes of this State, and particularly in some institutes I know of, where they have the very material available, and where the entire community takes a deep interest in it, and the subjects presented are the result of a great deal of study and careful thought and preparation. Many of these things would be worth vast sums of money, if they could be brought together in the form of an institute report of some kind and put before the people of the State.

Now, the change made in the State Department of Agriculture contemplates something of that kind, but it does not quite reach the situation. Provision was made by the last legislature, for the institute workers to report to Secretary Simpson of the State Department of Agriculture, and he has the authority and is instructed to make up his report from this and other matter which he may consider of interest in connection with such report. The reports, however, are not as complete, not as exhaustive, not as valuable as they should be. I think provision should be made for furnishing as complete and exhaustive a report of these institutes as possible; not with the understanding that it shall all go into Secretary Simpson's report; for, necessarily, the matter printed there will have to be somewhat restricted; but, I think, the reports made should be very complete, in order that a volume will be put out by the State Department of Agriculture that will be highly creditable and a lasting service to the department, in the form of methods presented at the various institutes. In that way it will be of great help. I believe, in order to bring this about, it might not be out of order, might not be a bad plan, to have the same principle in vogue here that we have in reference to the county fairs of the State; that is, that the secretary shall make that kind of a report, and that the securing of an appropriation shall be conditioned upon that kind of a report, the same as it is in reference to the county fairs. That will not be necessary in a majority of the cases, but it is necessary in some cases, and in order that unformity, in order that any institute organization may be properly represented. I think this report should be made to the secretary, and that the report should be made before the money is paid out, so that not only the people of that locality may receive the benefit, but the people of the entire State, and I am sure that plan will result in a series of reports of institute work, and the proceedings of the Department of Agriculture, and when the system is properly perfected and the organization made complete and strong, as it should be, it will make these reports of such demand that it will be necessary to very greatly increase the edition. I understand now that the edition is limited, that it is not as large as it should be.

In connection with these suggestions, it seems to me, it will be well to consider a plan by which the edition of the reports could be increased to such size, that not only institute workers and the institute officers in the various localities could have these reports, but that practically everybody who is interested in the work of institutes—farmers, stockmen, fruit growers, and all people who are interested in this work will find in that report material that will be of very great value to them throughout the year, and the edition should be so large that it will meet the demands throughout the State.

I believe that the developing and perfecting of the present system of institutes along some of these lines will not only stimulate greater interest in the institutes now being held, but will stimulate such an interest throughout the State, that there will be in a short time no county in the State that does not hold institutes. There are some counties who do not hold institutes, because they have not seen the advantage and become sufficiently interested; but I am sure this institute organization, that we have in Iowa is a good one.

As I stated in the outset, I htve no radical changes to suggest. I do not think any radical changes should be made. I believe it is a system well suited to Iowa; it is a system different from that in any other State. I like the Iowa system; it suits the Iowa people and puts them on their resources, develops their ingenuity and originality. They like to manage their institutes; they are getting more out of the institutes in two thirds of the counties in the State than are the people of any other state I know of.

The President: The next paper is entitled, "How to Conduct a Successful Institute," by Mrs. F. A. Squires, secretary of the Clay County Farmers' Institute, of Spencer.

HOW TO CONDUCT A SUCCESSFUL INSTITUTE.

Mrs. F. A. Squires, Spencer, Iowa.

Mr. Chairman, ladies and gentlemen: My subject "How to Conduct a Successful Institute," I supposed was to have been, "How We Have Succeeded."

Sixteen years ago a little band of Clay county farmers met in the city hall of Spencer to talk over the advisability of holding a farmers' institute. They made out a short program and decided on a time of meeting. It never occurred to the committee to have the date of this meeting published, hence, when the day set for the program arrived only those attending that meeting knew of it, and those few decided that persons attending such a meeting had certainly lost their senses, for they were very sure they knew all that was necessary for any one to know about farming. Thus the first institute in Clay county was a very quiet affair, and very soon forgotten, only by the few that made out the program.

The following year they decided to hold another institute, and when they succeeded in getting one lady to attend they felt they had made rapid strides in the work. This lady was the late Mrs. Higley, so well known to Iowa horticulturists. Thus they struggled on for four years, when they learned that some plan of action must be taken—they must have a system. They realized that it was a day of organization, and thought it best to perfect their organization, and when some member of the committee stated that a portion of the officers should be *women of action*, they had yet to learn women's wonderful ability to *push*. However, a part of the new officers were women. Strong, capable women, and this is the way they succeeded. Women have wonderful reasoning faculties, you no doubt know.

What should a farmers' institute be, and what are its benefits: First, it should not simply be a short gathering, talk at random, and close with "who shall and when shall" we draw our State money. The farmers' institutes are sources from which knowledge can be drawn. A stimulant to the pride and respect for farming. They bring farmers together in close social relations. They make public the latest discoveries in agriculture. They give the farmers of the State an opportunity to meet men who have made their business a science, as well as an art. "They are the banks for the deposit of experience, that they may become the common property of all." They are the organized friends of good crops and good prices. They teach the duties of home citizenship. They tend to keep a fair portion of the good boys upon the farms. "They energize and fertilize local thought, and arouse attention." They cost less, my friends, than a single cigar to each farmer of the State of Iowa.

Success in any avocation means doing it well. Doing it well is all that is necessary to make the humblest occupation honorable. Whether we are planning to raise corn or calves, peg shoes, write sermons, or do farmers' institute work, doing it well is the true ambition for every worker. Thus we made our plans and we have tried to follow them as closely as possible, although ever ready to grasp the new as it comes our way.

Clay county workers felt that they had scored their first success when they decided to place the opposite sex side by side with them, not only on the program committee, but also their names were to be found among the list of officers. The first meeting with the revised list was held in a small hall, and the first day it was well filled with the Clay county farmer and his wife, and in some instances with their families. The second day we were obliged to adjourn to one of the largest churches in Spencer. Thus, we have pushed beyond the border of every available building in Spencer, even to our grand new opera house. Last winter at our meeting the manager of the opera house was obliged to lock the doors before the evening program commenced, with people clamoring outside to get in. We, of course, in all these years, have had many dear experiences, and have profited by them.

One of the essential points we make at our institutes is that we meet all on common ground, trying to make each tired housewife feel she is welcome, then trying to make each overburdened farmer feel that he is having an outing, as well as meeting at a school where they are taught many new and noble ideas in the art of agriculture. It does our inmost souls good, and we feel well repaid for all our hard work for the institute, when at the close of nearly every session some of the farmers, or their wives in attendance, step up to our desk and say, "I want to shake hands with you; I have been helped so much by the many good things I have heard."

Another important feature of our institute is the "Woman's Session." We do not know if this branch of the institute originated with us in Iowa, yet we do know that with us it was original, never having heard of a "woman's session" until we had held ours two years. Can you imagine the look of consternation that spread over the countenances of the male officers when we proposed this? Ask them now what they think of it. We thought it best to hold these sessions separate, but one year of this taught us it was a mistake. The men are just as much—if not more—interested in what the women were doing, than the women were themselves.

We elect our president, vice president, secretary and treasurer for one year; never re-electing them for more than two years. If we find an officer is a valuable one, we place them on the executive committee for one year, and at the end of that time elect them again for their old offices——president or secretary as the case may be. Some of the officers of our institute have served in this capacity for ten years.

We have never changed our days for twelve consecutive years, although often changing our dates. Our days are Thursday, Friday and Saturday, and while Thursday and Friday are two of the best days for the farmer to leave home, Saturday the children are home from school, and the little members of the family can be left with the older children, that the mother may attend and enjoy the institute. It speaks better for an organization of this kind to be something that can be depended upon. People have learned this of the Clay county institute, that our days are established ones.

Since holding our Mid-Winter Fair in connection with the institute, we have made this request of each school director,—"that they grant Friday to the teacher," for the reason that, we make a few special offers to pupils' line of work; such as the best map of Iowa, specimen page of writing, etc., all for children under certain ages. And Mary and John enjoy seeing their work on exhibition just as much as their parents, and, too, we find that John and Mary enjoy attending the institute.

Our day sessions are made up of good solid work, with now and then a recitation by some farmer's boy or girl; always opening each session with an invocation and congregation singing.

This is the plan of our program: The first forenoon we rarely if ever try to call the meeting before ten o'clock. Beginning we have congregation singing,—this part being a very pleasant feature of the institute, and is conducted by some farmer or his wife who is an adept in that line. It is usually Nature hymns, or sacred ones, that are familiar to all, and all are requested to take part; and a stranger coming into the hall would surely think that no voice in all the Grand Opera House was silent. It creates a pleasant, restful feeling that otherwise would not exist. If the audience gathers early they are requested to stand during the singing. This is followed by the invocation. If for any reason a person is not present whose name appears on the program, the presiding officer calls on some one in the audience, who, as a rule, will respond. Then follows the president's annual address. The old officers can usually tell if a mistake has been made, if he be a new president. To close we have some topic of general interest, in which we try to have all join in the discussion. Thus closes the first session of our three days' work.

We try to overcome the mistake of so many institutes, i. e., the delay in beginning. If there is not more than a half dozen present when the time arrives to commence, we take up the work. People have learned this of our institute, and unless the morning is a very severe one the room is well filled at the opening hour.

The Woman's Session is next in line, and this is carried out in the entire by the ladies. If possible we secure a professor of domestic science to be with us on this afternoon. It is an afternoon we consider both pleasant and profitable. The institute president takes his place in the audience, and the ladies provide their own chairman.

Our county is composed of diversified farming, and we aim to have topics that will be of interest to the corn growers, the poultry men, dairy men, hoticulturists, and those interested in feeding stock. We secure the best authority that can be had on all these.

We have our regular dairy session, sheep session, corn session (this, of course, is a very prominent feature of all institutes). We have our corn exhibits in a room separate from the one in which the meetings take place, in which room it is scored and judged, and those who care to, after the corn talk is over, may go to this room and watch the work that is being done. We have secured two prominent corn men from Ames this year, and while one is doing the scoring the other will try, as far as possible—and it is nearly always possible—to answer the questions the average farmer will ask. As far as possible we have the topics discussed by the farmers themselves. We learned, early in this work, that it was far the better way to have a farmer tell in his own way what he has done in his line, and how he did it, than have a man far more learned discuss the subject in an exhaustive manner, and you will rarely, if ever, get any response from the average farmer assembled. However, on the other hand, if a farmer leads, they seem so much better prepared to take up the line of thought conveyed by their brother in the work.

We are very careful when we find it necessary to secure a general helper, or referee, if he is called on at the session to give a talk, not to have his address too long, and not have it too general, but go more into sufficient detail. We appreciate the fact that such helpers do not, or are not, supposed to understand the views of the farmers present, and hence if their talks are at all profitable, supplement them by answers to such questions as the audience may propose.

We do not designate when asking a party to take a topic, whether it shall be written or oral. Of course it all depends upon circumstances. Some speakers can express their thoughts by a carefully prepared manuscript, and others by speech.

We do not make the institute an object to exhort farmers to better methods, but as to enable them to teach themselves and take advantage of these better methods.

We try to overcome the mistake of putting too much time on a paper, and too little on a discussion. Sometimes, however, it is important to shut off discussion, and the good judgment and tact of the chairman must see to this. We believe that discussions must never be allowed to drift into immaterial things. We have seen too many institutes used for rambling exhortation of themselves, their county and State.

Another great mistake we avoid is having too many subjects. We regard three or four at most to be enough for one session. We allow neither politics or religion to enter any discussion at our institute, yet we had a very tactful man last year who laid out the morals and ethics underlying both, in a non-partisan way. It was so nicely done that the chairman did not have the heart to call the topic off, and it seemed to produce its nice effect in its way. It is needless for me to say that no institute is or can expect to be successful unless the farmers' wives take a part in the program, and it always insures a full house.

We sometimes offer a prize for the best essay on housekeeping, to be written by young women of certain age for such a township. The boys from that township will all be there, and also from other townships. Oh, those boys, our future men, it is those the institutes are after.

It very often happens in institutes that those needing the instructions, the talks, the social features, and all the good things that are to be found in a well conducted institute, the most, are the ones who are the least apt to attend. We observed this, and now we have a special committee in each township to look after those who are least likely to attend, and manage, if possible, to get them there at least a part of the time. Get them to bring an exhibit for the midwinter fair; place some small member of the family on the program for a short recitation; teach them the institute is theirs, that it was gotten up for them, and that they have an interest in it. Some one of these incentives will bring them there, and once there the victory is ours.

Our evenings are devoted entirely to light entertainments. The first evening we have the welcome address by the mayor of the city, which is responded to by a farmer, his wife or daughter. The rest of the evening is given to music, recitations and address by some prominent lecturer, etc.

Friday evening is called the "educational evening." A large number of Clay county teachers are usually present, and the boys and girls from the surrounding country, while the village turn out *en masse*. For this evening we have a strong address, something that will furnish each one present food for thought for a long time after the institute has ceased to be. For a number of years our evening entertainments were free, and we found that a certain element attended who did not desire to listen, and intended that none within their radius should get a chance to do so, no matter how much they might wish to. To overcome this we now have a small admittance fee, and if anything our audiences are larger, and certainly more orderly and appreciative.

If possible when holding our institutes we, as our ancestors would say, "hold it in the moon." The young people find it very convenient to drive by moonlight, and is highly gratifying to the older ones. We have a number of times been called to other counties to consult with the officers of their institute, as to just why and where they fail. I well remember one institute among the list of officers of which there was just one farmer, and he had retired to the village several years before; and not even a lady was to be thought of among the officers, or committees. It would be the last blow, in fact it was all that was needed to kill it entirely. The first day the president arrived about ten o'clock; his wife and myself were the only persons in the audience. The secretary came in about eleven o'clock, the rest of the officers the next day. A fair-sized audience for such an institute was seated at about fifteen minutes of twelve. During the carrying out of the program, when the election took place it was done in a haphazzard way. When the proper time came I advised them as to how we carried this out, and helped them to make out a list, not placing on the ballot one single person's name from the village, with the exception of the county superintendent, she being a lady. We organized a "Woman's Session," taking prominent women from the country who were proud to do this work. The next year I attended the same institute again; we commenced on time, with three persons in the room, and how many regrets there were when they found the new president had commenced the program on time, and had not waited for them to come. They now have a lovely, flourishing institute that the county is proud of.

You institute people who are present know that all this takes a great deal of time, and labor, and oftentimes with but very little cash with which to work. We trust it has never been said of Clay county that all she works for is money. We know other counties have been accused of this, and no doubt justly.

All through the year we keep up the interest by having small interesting items printed in the local papers. We are pushing on and on, far beyond the borders of our county, and we hope always to be numbered among the institutes to help agriculture challenge, not only a small portion of our counties, but the admiration of the whole world.

THE PRESIDENT: We have with us this morning one of the bright, intelligent ladies of the State, Mrs. Isaac Lee Hillis, who will now address you.

REMARKS BY MRS. HILLIS.

Through the courtesy of your secretary I have been permitted to come to you for a few minutes to discuss a feature of farmers' institute work that has been touched upon so admirably in the fine paper you have just heard.

I am not a farmer, nor a farmer's wife, nor do I live on the farm, but I have had a Jersey cow, made my own butter, hatched chickens in an incubator, read Wallaces' Farmer and the Woman's Farm Journal, and I think I am pretty closely in touch with what you are doing, and if I do not belong to your family, I think you ought to call me a sort of a sister-in-law or stepsister.

I am greatly interested to learn of the newest and best methods of creating the highest standard of development in cattle, corn and horses. I understand you have today, at the Capitol, a very fine exhibit of corn—every ear is up to the standard in weight, color and size. I wonder how many of you have lost sight of the fact that there is something more important to you as farmers and as men and citizens, than cattle, corn and horses; and that is your boys and girls. How many of you have found that your boys and girls are up to the standard of development? Are there any off color, under size, not fully grown to the best possible girlhood and manhood?

You know, one hundred years ago the new science of agriculture was almost unknown; each farmer had to work out his problems for himself. There were no great colleges, and no special courses of study for the farmers; and twenty-five years ago there were no special courses of study for the home-keeper. But all that is changed. You have your great agricultural colleges, farmers' institutes, your splendid equipment, so every farmer who wants to can bring his corn and cattle up to the highest standard.

I am here to tell you that within the last few years, possibly fifteen years, and every day increases the equipment, and there is now a science of child culture, and today the father and mother in the farm and city home can, if they want to, if they will act with a determined effort, can bring their boys and girls up to the highest standard of physical, mental and moral development. I believe the fathers and mothers on the farm are just as much interested in making the girls and boys on the farm the fine specimens they ought to be, as they are in making cattle and corn fine specimens.

Let me urge that you organize, not only a woman's department, but a home and child culture department; that you have sessions where housekeepers and mothers can discuss this great question of bringing up children as they should be. Let it not only be an annual thing, but let such literature be given out that the best things in domestic economy, domestic science and the culture of the child in its manifold relations shall be made an everyday culture.

I am sorry there are not many women in this session today. I believe they will miss a great deal in the sessions that are to come. In New York, under the organization of the New York mothers, there are four hundred organizations. In Illinois, the president of the Illinois Congress of Mothers writes me that they are busy all week organizing child culture departments.

I am here in behalf of the Iowa Congress of Mothers to tell you that we hold ourselves ready to meet with you at any time and at any place in Iowa. We will give you a list of speakers who will meet with you, if you prefer, and in many instances will give you literature and study outlines, so simple and so inexpensive that every woman can have them. We will tell the women how to organize a little neighborhood group to meet occasionally, weekly or semi-monthly, and discuss these questions and keep in close touch with the work, and we want to extend a most cordial invitation to them to meet us at the headquarters at the State Fair Grounds. I want to urge this upon the superintendents of the county institutes, that you do not spend all your time in these things which build up material wealth. What avails it to you if you are master of a thousand acres, your splendid herds, and your crops? What amounts it to, if that boy of yours, who is dearer to you than your right arm, if he fails to obtain the years of development that you want for him, He can have it; he may have it, if you, his father and his mother, begin now with the little child, to train it as it should be trained.

I will be very glad to confer in this matter with any of the county superintendents and managers of county institutes who want the co-operation of our organization, and would be very happy to talk with any of the women of this organization. I believe there is a great field here, and I look to the future of our great Agricultural College at Ames, which stands for so much, to introduce child culture in that institution. I look forward to the time when that institution, along with its domestic economy, with its training of the young men, will also inaugurate a child culture department. I believe it entirely feasible to take these children and put them in a special department under the care of an expert. I believe these children should be of both sexes. I believe every girl in that institution should spend some time in that nursery, where these children are trained. I think that a class of these children should be taken before the whole school, so that the students might learn the real development of the children, the awakening of their mental faculties—the moral sense should be indicated and made plain to these people, so that when they get away from this great institution they will not only be cattle breeders or horticulturists, but that they shall be prepared for that culture which we all expect of them. I believe this is no fancy sketch. I think, as the years develop, that will come, and that our young people of the State will have an opportunity to get an all-around education. I believe the prediction I make here today will after a while be verified in our State work.

THE PRESIDENT: We will listen to a further discussion of this matter of institutes, by the Hon. Eugene Secor of Forest City.

Preparatory to the reading of his paper, Mr. Secor said:

Not being a ready platform speaker, I have reduced what I shall have to say into manuscript form. If I shall touch somewhat on the same ideas, in some matters, with Professor Curtiss, it will only show, that I say Amen to his ideas. I am somewhat embarrassed in following such an excellent address as you have had by Mrs. Squires of Clay county. I am sure I can not hope to interest you as she did, but I am on the program and am rather forced into this position and consequently I will do the best I can.

HOW TO CONDUCT A FARMERS' INSTITUTE.

Eugene Secor, Forest City.

I have not sufficient self-confidence to believe that I can answer this question better than a hundred other men the secretary might have selected to talk on this subject. I don't believe I know all about conducting these annual farmers' gatherings. In fact, I am sure of it, for I have learned a good many things in the last eight years' experience, and as I don't want to confess that I am past improving, I think that I might still add to my store of knowledge in this respect.

I realize the fact that there are a great many unlike conditions, even in Iowa, and that we can not lay down any cast-iron rules for the management of a farmers' institute any more than we can lay down inflexible rules for the management of children.

Communities differ. A plan that will work in one county might not be successful in another. Subjects and men that would interest one community might not another.

I want to say right here that the more I think about it the better I like our Iowa plan. There is a flavor of the old town meeting about it. The ones interested run their own affairs.

The people of any county ought to be better able to choose subjects and speakers suited to their needs than any central office could possibly be.

I have watched the workings of the centralized plan in some of our neighboring states, where a number of lecturers are sent from county to county, each one especially fitted to present some subject, and after he has made his speech he goes to the next county, and so around the circuit, presenting practically the same theme wherever he goes. In some communities it may be exactly what they need, while in others it creates no interest or enthusiasm, and I think does not develop the local interest or talent as our plan does. It may be cheaper than our method, but is it better?

What I like about our institute law is the freedom it gives every county to choose the lecturers that the people want to hear. It puts upon every county the responsibility for the successful outcome of the convention. Our plan brings out hidden local talent that no central head would ever discover, and being run by home men, there is greater liberty to ask questions and to draw out practical information.

But in order to have a successful institute it is necessary that the organization have some capable man or men at the head. If the right man can be found for secretary, happy ought that county to be. If perchance he is hard to find, put all the hard work on the president or executive committee. It is necessary that some one puts a good deal of time and thought into it—time and thought for which he is never paid except by the consciousness of trying to do good.

And if some one can stimulate the thoughts and activities of his fellows, if he can incite them to more thorough work, make better farmers of them, see them improve in material wealth and in home building, that ought to be some satisfaction even if he does not make every stroke pay.

The president, or secretary, or executive committee, or some one needs to do effective work in various ways for some weeks in advance of the meeting.

Some one must do a little thinking during the year. He must talk with the leading farmers and find out what they are thinking about—get their ideas of the subjects that ought to be discussed, and the men they would like to hear. He must be arranging, or at least meditating on topics for discussion long before the meeting. No hastily prepared program is likely to be as satisfactory as one deliberately thought out. If everything is left till the last week many disappointments may be expected.

Speakers must be engaged while they have open dates, for our best institute workers are in great demand during the winter season, when most of the institutes are held.

The institute ought to be moved from place to place in the county, so that all may have its advantages. The State appropriation is for the benefit of the people and this should be kept in mind. It should be a *movable feast* both in respect to date and locality. But the date and place ought not be fixed a year in advance unless such preliminaries are arranged by the inviting town as will insure its success.

The State appropriation is not large enough to provide the best talent from abroad and meet other expenses incident to a good convention, and we must choose between mostly home talent with small outlay, and aid from local business men to obtain strong men in the specialties we wish discussed.

It has been our practice of late years to leave the fixing of the time and place to the officers of the county association. They are then able to open negotiations with the towns wanting the next meeting.

We say to the representatives of the town applying: "There are certain things necessary for a successful meeting and before we appoint the institute we ask that you provide.

"First. A suitable hall free.

"Second. Hotel entertainment for our speakers and workers.

"Third. Local music for evening sessions.

"Fourth. A certain sum of money for paying premiums, etc."

By this plan we have no difficulty in supplementing the State appropriation, and by the very fact of asking the town to help we interest the people of that community more certainly than if we dumped the thing into their laps "free gratis for nothing." We take an interest in whatever costs us something. No effort, no interest.

Having arranged the preliminaries, we try to get the local papers talking about the institute. They are always glad to do this if they are given a few facts. If some one is expected whom the farmers know or have heard of, let the papers advertise it. If a specialist is to talk on some topic of interest to the farmers, or of prospective interest, let it be known. Publish the convention so widely that everybody in the county will know the time and place in advance. Get them talking about it, if possible. In one town the business men organized, appointed a committee which sent out special invitations by mail, and we had a magnificent turnout and a great meeting. The best work can not be done without a crowd. There is no inspiration in vacant seats.

Whether there should be a set program and papers read, or whether topics should be announced and a free-for-all discussion called out depends, I think, on local conditions. In a community made up largely of intelligent and well-read farmers, and with a presiding officer well acquainted with the people and capable of drawing them out, a very interesting time might be had without essays, but for the average community, and the average unwillingness of farmers to express themselves in puglic, I think it is well to have the discussion opened by some one who has had time to give it some thought. I aim to give local talent the first inning, then call out my reserve. After he speaks I invite question or discussion.

It may need a good deal of urging to get some men (and women) to agree to read a paper, but I have often been surprised at the ability shown when they once attempt it. This is the talent that needs bringing out in every township, for if you can get a man thinking it is pretty sure to benefit him, and if he is led to more intelligent and profitable practices his neighbors will soon catch his spirit. Good works, like the measles, are infectious by contact.

I think our county institute was among the first to take up the matter of offering premiums on corn. It has proved to be the means of interesting the farmers more than any other one thing, and the lectures on the subject have proven a great stimulus to the wide-awake young men who attend. It is hard to reform the old but there is hope for the young.

The average farmer thinks that he can raise a little finer corn than any of his neighbors, and the bait of silver coin in a premium list is attractive enough to induce him to nibble at it. After he gets there he may learn something about corn that he never thought of before, especially if he comes in contact with a man like Professor Holden.

We try to have the evening entertainment of such a nature that the town people will attend. It usually consists of a lecture or address, or addresses, with some music and occasionally an entertaining elocutionary effort by some teacher or pupil, but I have never thought it wise to devote valuable time to mere entertainment except as thrown in for variety.

I like to see the farmers' wives attend, and always try to get them a place on the program, but in some communities both are hard things to bring about. I am sorry to say that some of our foreign-born neighbors, although among the best of our citizenship, are slow to learn that the women need recreation and culture as well as the men.

The most encouraging feature of these county institutes is the increased interest taken in them from year to year. Farmers are a conservative class, and when these meetings were first called they acted as if they were taking the measure of the lectures. They wondered if some one hadn't an ax to grind. When they found that farmers' institutes are not quite so high toned as the name indicates and that there was no scheme to be worked they gradually warmed up to the subject.

Institutes must be instructive, but the fodder must not be put so high that the common people can not reach it. At these meetings science should be presented in as simple language as possible.

Subjects which might excite religious or partisan discussion ought to be religiously avoided, and speakers ought not to be allowed to stir up party spirit or personal feeling.

THE PRESIDENT: I see before me a large number of farmers, members of the Iowa Institute. We will be pleased to hear from any of them. Mr. Fox, we would like to hear from you.

REMARKS BY MR. FOX.

I do not believe in much more than two thirds of all the good things that have been said as regards the present institute law and the matter of running institutes. I think there is an old adage that the sire is half the herd, and I think that the president of the institute is at least half the institute. The last gentleman upon the program touched upon that largely. I hope that the secretary of the Clay County Institute will forget that, or forgive me for referring to it.

I can not believe, as I have just indicated, that the best thoughts, or the best interests, are brought out by the local discussions. I believe that Professor Curtiss, Professor Kennedy and Professor Holden, and in Kansas, Commissioner Coburn, have done more for the institutes, and that Professor Holden has done more for the institutes of Iowa than all the farmers combined. It is true that each one of these members thinks perhaps he can raise a little better corn; it may be possible he thinks he can raise a little better wheat, but he does not go up there and tell you how he does it. He is keeping it as a State secret; it is very seldom he will tell you. He is not putting out his hands to keep the other fellow from running into a stone wall (I was raised in the State of Maine, where we had those things; in Iowa I should say a wire fence). There is not one of the presidents or secretaries of the institutes in the ninety-nine counties who can make him tell you how he does it. I have known Curtiss to ride all night, sitting up in the common coaches, as he had to, to get into a program at ten o'clock the next morning, without even having an opportunity to take a bath at one of our hotels. We have had a little too much harmony. Stir up!

THE PRESIDENT: We have with us F. D. Coburn of Kansas. We would like to hear from him in regard to how they conduct institutes in that state.

REMARKS OF F. D. COBURN.

I think it is due to myself to correct your Honorable president and say that I am not a professor. Possibly I am the only man in this room who does not profess.

A State like Iowa, that has produced a Grimes, a Kirkwood, a Curtiss and a Wilson, and a Beardshear, inevitably must have the foremost place in the galaxy of states, and when a man from the outside, especially a man from the remote and woolly west comes to Iowa, he does not come to instruct or to profess, but to sit at the feet of your wise men and absorb such wisdom as he is capable of absorbing.

I notice from your program, and from the remarks and papers here this morning, that you have up the subject of institutes. I am not familiar with your institute law and do not know what it may be. I come from a State which has no institute law, or no series of institutes which are conducted under State auspices, although we have incidentally or practically a great many excellent institutes. The most that our State does is to make a small appropriation for paying the expenses of the gentlemen from the agricultural colleges to attend to institutes that are worked up by the local people. The general scheme is to have two professors from the Agricultural College at each of these institutes, especially if they are invited, and they usually are; and it is not uncommon, also, to have a professor from the State University, which in our State, as your own, is an entirely different institution from the Agricultural College.

One comment on the position taken by the gentleman who read a most excellent paper a few minutes ago. He seems to think that having these gentlemen from the institutions, for instance, is not the wisest plan, or at least it is not the wisest plan to have them dominate, at all events, the institute. In our State they do not dominate the institutes at all. The institutes are entirely in the hands of the local management; unless such local management works up the institute, there is none. These outsiders, if you please, are merely there by invitation. I want to say it is tremendously advantageous and it ought to be helpful to a community of farmers, each one of whom has been occupied early and late with his own affairs, to have some man like Professor Curtiss, Professor Kennedy or Professor Holden come there and speak upon some subject of which he has made a life-long study.

I may suggest, too, that in our State we do not send out any lecturer who does not have more than one lecture or more than one subject, and when he goes to a certain part of the State where conditions are of a certain sort, or whoever goes, is presumed to have an address or lecture that will be adapted to the occasion and circumstances; that is to say, we aim, at least, to have the punishment fit the crime in each instance.

Speaking for myself, I regard these addresses by these specialists of incalculable value to the institute. For example, at the meeting of the Sate Board of Agriculture two years ago, we had a young man (by the way, a pupil of Professor Holden) there to talk to us about corn. He was a young fellow, a boy in appearance. When he came forward there was a general expression of wonder upon the countenances of the members, if not expressed by words, as to what that kid could tell us old farmers about corn. Some one asked me in a sort of a rebuking tone why on earth we brought a fellow like that all the way from Illinois to talk to men two or three times his age, about corn. I remember distinctly my reply was, "If he does not tell you more about corn in thirty minutes than you have learned in fifty years, I will come and apologize to you." This young fellow got up and cut loose. I presume that if any of you gentleman had heard him you would say that you probably never in your life heard such a torrent of corn talk and corn information as he gave out there. I think I am entirely modest in my statement when I say that his address, published as it was, far and wide in our State, was cheap at one million dollars; dirt cheap; cheap as corn at ten cents a bushel. That is one example.

Along that line I might say that we have here in the room a Kansas boy, one of my boys, if you please, who is on the program here this afternoon to talk about alfalfa. If he does not tell you more about alfalfa in thirty minutes than you ever heard of or dreamed of in your life, I will apologize to you from this platform. He is a modest fellow; he does not pretend to know much; but he will do you good with alfalfa.

I speak of these two gentlemen as illustrations of the possibilities of having this outside or imported talent at these meetings, and if I were to attempt to influence you at all, it would be in the direction of not overlooking that sort of assistance in your work. It does not put a man down by any means, to say that he is a professor, or to say that he is a school teacher. He may be all of this and yet know infinitely more about your business than you have ever dreamed of. And so, to repeat, I would encourage you to take cognizance of these facts and get as much outside help as you can, if it is the right sort—not everybody to talk at your meetings and dominate your time, but when opportunity presents itself for getting the right sort of men from the outside of your own community and your own local atmosphere, so do it by all means, and you will find it a wonderful and wholesome adjunct to your work.

That is all I care to say, Mr. President. I am not Mr. Butt-in; I find myself on the program this afternoon, and I will try to be here on time, if I can. I thank you.

Mr. Mills: I arise to defend the farmers. I want to inform you from the start that I am from Story county—right up where we make professors, and Mr. Curtiss is a farmer amongst us. He was born, and I believe brought up in Story county. We do not have to go to Illinois or to Kansas for our talent. We live in a community, where, if you get the farmers stirred up a little, they will get up and discuss these questions; plenty of them. We have no quarrel, no fight with the professors; we all agree; we invite the professors out to our meetings and they come and talk to us.

As I am not a public speaker, I have exhausted my subject, and I thank you for your attention.

A Member: I think the gentleman back in the audience put the institutes in the wrong light. We do not wish to cut out professors, by any means, and still hold the management of the institutes for ourselves. We will use what talent we can and get other talent wherever we can and as we think we need it. What we are opposed to, is any mutilation of this law with regard to institutes. We want our professors and we want to use them as we can.

Mr. Spangler: I am a farmer, and perhaps among the older, if not the oldest farmer present and I confess, I am unusually pleased at the situation, at the competition as between counties and professional men, etc. I never made a public speech in my life, but I have been very much entertained by the paper from Clay county, and also the other address by the lady—wonderfully elevated. But it occurs to me we are all members of the human family and possess very much the same nature. The great principles of co-operation and competition I find among the farmers, and these two great principles are at the bottom of all commercial and national trade, and everything of the kind. I am pleased to see the farmers raise the question as to who really has the right of leadership.

I must say, I am somewhat in sympathy with home talent. I forgot to say, I am from Buchanan county. I am a farmer; always have taken some interest in agricultural questions. I have been interested in the fair business there for nearly a lifetime, and am yet. While I have expressed the wish to be retired after being seventy-four years old, they haven't retired me. They are violating the rules of professorships, schools and colleges, and I guess the churches and all. Pardon me, if I say something that is a little out of order, a little extreme; excuse it, because I am an old boy and should have been relieved long ago; but I haven't quit and they haven't discharged me—I want an honorable discharge.

But I have been remarkably pleased over the feeling and competition between the leadership and the rank and file. I have the greatest of respect for professors. They can frequently reduce to a mathematical point questions that we can not fully comprehend, as plain as twice 2 is 4, and generally a farmer can not make his problems that plain. I am always glad to get suggestions from the men that can make it mathematically plain. I turn my cattle on bluegrass and feed them a little grain, etc. Perhaps I would not be too honest to try to make it appear, when I sell them, that they are wholly corn-fed cattle. I plead guilty to these things. Selfishness is one of the laws of nature. It exists in Buchanan county. It is not strange at all that professors should be suspicious and raise important questions.

MR. FRANKLIN: Our friend from Story county, if he will look around, he will see quite a number of farmers here; he is not alone in his ideas. I desire to take the ground of the happy medium, between the two extremes. We need the professors and the imported speaker, and we also need the home talent. One of the best institutes I ever attended in my life was at a place where an imported speaker had the ability to bring out the hidden talent of the farmers and caused them to ask questions.

and by asking questions (which didn't seem to puzzle him very much), the meeting became one of the most interesting I ever attended.

A good plan to conduct an institute is to get a certain number of outside institute workers who have the faculty of bringing out the home talent, cause men to tell what they know. A great many farmers do not tell what they know; some tell a whole lot more than they know.

A MEMBER: I am a farmer. I brought two or three or four of my neighbors with me, and they have been punching my back to say something, so that we would be represented in this convention. When I started from home I went down with the intention, as I heard it rumored around, altogether different from what I find it here today. They told me, as I got it through certain papers, that it was a kind of a farmers' union organization. Of course, they may call it farmers union or they may call it farmers of agriculture; I don't know. But it seems to me they are talking about raising corn and raising alfalfa in Kansas and other points, and do not come down to the fact which concerns very much the farming community.

Now, I may be entirely out of order in explaining myself, but it is with the intention I come to find out something in regard to disposing of our agricultural product. Now most anybody can raise something. Of course, we can raise it as well as these here professionals of some college, that has the State to back them; they can experiment with one thing or another and they can get certain things to grow remarkably well. The gentleman from Kansas is going to talk alfalfa; it didn't do at all with me. But as I said before, we can raise a whole lot, but what can we get for it?

A MEMBER: This is a sort of a Methodist love feast to me. Brother Secor's suggestion is quite applicable. It is like the measles; it is contagious. Now, I have always doubted, at least for a few days I have doubted, the sanity of my wife. The other morning she said to me that the Lord Almighty, when he distributed that article called common sense, that I must have been hidden somewhere. I am also reminded of something Senator Dolliver said to me the other day. He came to my house. I don't know that he would have come, only that it suited his convenience. He owns a farm in our county and it suited his convenience to stay all night. In walking about the yard and talking about different things, he said to me, "Let me tell you one thing that I have observed in my study of men. There is not a man in New York City today, and I don't know but what he said in Washington, that was tall enough to be seen beyond the Mississippi, but what walked up from the plow furrow. I am proud of the farmers; I am proud of the farmers' boys and the farmers' girls. I believe this much, I do not know whether you all agree with me, that the sum total of human happiness stands upon a higher plane to me among the farmers of the United States of America, and more praticularly among the farmers of the great commonwealth of Iowa, than any other class of people on God's green earth."

It has been said to me, why don't you get off the farm—trying to make me believe I was out of my sphere—I am just exactly where I want to be. I am just exactly where God Almighty intended me to be. I was born on a farm and I have no desire to leave it. But these two papers, the one by the lady, and brother Secor's, just touched every fibre in my heart; it has been an uplifting to me.

Last winter the president of our Humboldt County Institute 'phoned up to me and wanted me to get up a program for the farmers institute. It was only the year before that we discussed the necessity and possibilities of the value of the telephone—you know that was the inspiration—and before the next institute we had it all over the county. I want to tell you about the value of that telephone. Do you know, we had twenty-seven different subjects upon our program and I 'phoned every one of these to the men and ladies from my own home and assigned them their subjects. If I had gone to them individually, I would have had to drive one hundred and fifty miles. The result of it was, we had a splendid institute; a grand thing; an uplifting. I know young men and women, farmers and their wives, who never stood up before an audience, but we worked them in, got them on the program, and we drew out the hidden, the latent talent. I have been surprised at the latent talent in my own community. Young boys that came to school to me there—I am proud of them and their ideas.

I came down here, not to speak, but to get inspiration; I have got it. I do not regret any sacrifice I have made in coming one hundred and thirty miles to get here. I want to go back home and carry some of the lessons that I have gathered here into our institute work.

MR. FORSTER: My observation has been that wise men will differ. I am up here as a student. The Saturday prior to this last, in our horticultural meeting held in Albia, the papers there enthused the farmers so that they began to ask for a farmers institute, and they at once set to work to organize, or rather, I called a meeting. On last Saturday, the 5th, we organized by electing the proper officers and electing delegates to attend this meeting, and they wanted a report carried back. I am proud to say I have the honor of acting as their president, unworthy as I am; but I am like the boys; I was their choice and I am here to act.

I am heartily pleased with the paper the lady read, the secretary from Clay county. That has done me a world of good, and if the Lord will help me to unfold it, I will try to reveal some of the secrets to our people. The paper read by Mr. Secor was of great value. I thank the audience for their attention. I am heartily pleased.

A MEMBER: I am glad I was selected a delegate to report what I listened to and heard here today. The lady that spoke in regard to the youths, the boys and girls, impressed me wonderfully—the improvement of the boys and girls is a wonderful thought that came to me in this building today. I have some of my children here under the instruction of the Commercial School and am remaining upon the farm for the help which I can give my children, as that lady has spoken to us, and also the sister who has read the paper on how to run an institute.

I have been president of the Ringgold County Institute. We have two institutes annually. We have organized a township institute. Professors Holden and Wright give us wonderful assistance. We are now preparing for our annual institute, to be held in January. I came up in order to secure my help. I would like to have the help of the sister that came here. It is wonderful to me; it has given me great inspiration. I believe in this institute work there is a great help to be given to the farmer. The farmer has pride and ambition in himself which has been neglected in the offspring from the home. We ought to meet together in our home; but we need the assistance from the outside world; from the mothers of our country, as we have here today, trying to bring the children to a higher standard. We come to you today to ask your assistance. But the inspiration I got from the mother, and from the sister upon the platform, has inspired me with greater zeal to try and get my mothers and sisters to do more for their children.

At 11:45 the convention adjourned until 1:30 P.M.

AFTERNOON SESSION.

Convention called to order at 1:30 P.M.

THE PRESIDENT: We have with us this afternoon the Hon. John Hamilton, Institute Specialist, Department of Agriculture, Washington, D. C. After Mr. Hamilton's address, any question any gentleman wishes to ask him, he will be glad to answer. I now have the pleasure of introducing to you the Hon. John Hamilton.

THE VALUE OF ORGANIZATION IN INSTITUTE WORK.

Remarks by Mr. Hamilton.

I suppose that I owe an apology to you for not being here this morning at the time I was put down on the program. I started in good time from Washington City, and ought to have been here to have taken my place at 9 o'clock, but the breakdown of two engines caused me to miss connections at Chicago, and of course I failed to reach here in time. I regret this because I wished very much to hear the discussions upon the two subjects—"Should the Institute Law Be Changed" and "How To Conduct a Successful Institute." These topics have been before you, and if what I shall say duplicates the things already mentioned, you will understand that it is because I was not here and do not know what was stated in the papers.

The topic that has been assigned to me for discussion is "The Value of Organization in Institute Work." I understand that in your State the several counties have separate institute organizations; that the law fixes the constitution of these organizations and the method of their support: that there is no central authority to which these institutes are expected to report, or that has supervision over their work; that each county institute is in fact an independent entity.

I think that I am voicing your sentiments when I say that we are all in favor of organization. Certainly our whole social system is based upon that principle. Our forefathers tried for awhile to get along without organization or union. The colonies, you will remember, did not co-operate until driven together by the war of the Revolution. After the war they realized the absolute necessity of centralization so that when occasion demanded the whole power of the country could be concentrated in a single direction.

Our State governments have similar constitution; a central authority, and then local organizations. Our counties likewise are based upon the same principle; a central or county organization, and then the townships which take care of local affairs. We carry the same method into our church government. The churches are organized upon the conviction that the influence of the societies will be much more powerful, and their benefit to the public be much more beneficial if there is some central controlling authority. In the light of our experience and practice in state, and church, and business management there would seem to be no good reason why our institutes should not be organized on the same basis. Why there should be lack of united effort and co-operation by institute societies, and they continue independent of each other when in all other affairs in which we desire the greatest efficiency we unite, is incomprehensible.

Perhaps I can do no better in showing the value of central control than by giving you one or two examples of things that institute organization has accomplished. I have in mind one of the Eastern States that had an institute organization similar to yours. When the institutes started they were very much in the condition that they are now in your State. The various county organizations held their institutes independent of each other. There was no central control.

This condition of things lasted until about eight years ago, when a Department of Agriculture was organized at the Capitol of the State. In organizing that Department it was provided that the Deputy Secretary of Agriculture should be the Director of the Farmers' Institutes. To him was committed the general oversight and control of the institute work, and at the same time he was required to co-operate with the county agricultural societies and all similar county agricultural organizations in preparing programs, selecting speakers and fixing upon places where institutes shall be held.

Upon beginning the work under the new system there were several things that it was found possible to undertake that were impossible before, and it is to two of these that I desire to call your attention in order to show how influential institutes such as you have in this State can be if properly directed and under central control.

Some of us were very much interested in the improvement of the rural schools in our State. We felt that the country schools were not much better than they had been forty or fifty years ago, whilst on the other hand the city and town schools had greatly improved. The towns had commodious buildings, excellent teachers, and all of the appliances necessary for giving children a good modern education. Out in the country it was the same old cross-road schoolhouse; one teacher; sometimes many scholars; in other instances, very few. The curriculum of studies was not materially changed from that of half a century ago. There practically had been no improvement in that respect, although country life had wholly different problems to meet, and country children were environed by altogether different social surroundings. The first thing we did to bring about a change of public sentiment on the subject of rural school improvement was to require that an evening session in every farmers' institute held in the State should be given up to the consideration of the education of the farmer and his children, so that in every one of the two or three hundred institutes that were held that year, that subject was discussed. The State was districted and institute lecturers were sent out by State authority into each district. With each one of these institute forces there was at least one man who was especially qualified to give instruction along the line of the education of country children. We went to a great deal of trouble and some expense to advertise the meetings that were to be held for the improvement of the rural schools. We sent out circulars, programs, and personal letters to the school teachers, also packages containing small advertisements, to be given to the children, calling attention to the fact that the subject of the education of rural people was to be taken up and discussed by prominent educators upon a given evening. The school children were invited; county superintendents, the school directors, and all who were interested in education were asked to come. The result was that we would have meetings, packed with people interested in this subject, and perhaps there would be three or four front seats across the schoolhouse filled with little children, who had come to hear this discussion of their education. The lecturer would take some natural object, as for instance, a peach limb. He would tell the children how the buds were arranged; how the sap circulates; what the leaf is to do; how the starch is transferred; the difference between the leaf buds, and the flower buds; how the fruit is formed, continuing his explanations for perhaps thirty or forty minutes. The lecturers were experts in the subjects that they presented; knew how to make their story interesting, and there would not be a sleepy eye in the entire audience, the smallest child thoroughly understanding and enjoying what these men were teaching. The result was that after the lecture men would get up in the audience and say, "Why can't we have this kind of instruction in our public schools?"

The campaign of education by means of the farmers' institutes was conducted for five years throughout Pennsylvania until the most of the people of the State had been reached. Country people began to see that it was entirely feasible to teach to rural children subjects which had formerly been confined to college classes and the higher schools. We made a canvass of the State and found that in the rural schools the average number of classes taught each day was twenty-seven, which gave an average of about twelve minutes to the class. Out of that had to be taken the time necessary to assign lessons, keep order, and assist scholars in their work, and it didn't leave more than about nine minutes to each for class instruction.

In the town and city schools where the teacher had an average of only eight or nine classes, the time devoted to each was anywhere from thirty to forty minutes. We showed to a demonstration that all talk about improving the rural schools by introducing nature study while such a system continued was wasted breath; that the system was defective; that it was impossible to add anything to the curriculum of studies in the country schools unless there was first some change in this system.

Then we began to talk about a remedy, the consolidation of the rural schools. This was kept up for six or seven years, until the people became thoroughly aroused and informed upon that subject. When this was accomplished we went into the State legislature and asked for the enactment of a law that would permit the consolidation of the rural schools into a single township school, and provide for the conveying of the children from their homes to and from the central building. We made an investigation of the work done elsewhere in centralizing schools, and this was also preached over the State until the people saw that it too was practicable. So when the Consolidation Act came before the legislature there was comparatively little opposition to it, and now there is in that State a law that permits each township to have a single central consolidated school, a school graded as in the city or town, to which every child may be hauled that is not within walking distance.

I give this example because it shows that in the course of a very few years it is possible to unify public sentiment in the rural districts if there is some directing power to take the initiative. No great change in social or governmental affairs can be effected in this country until a majority of the voters are agreed. Just as soon as the voting community understands that the change is to their advantage, that soon, and no sooner, we get it.

There was another matter of public interest that was taken up in that same State about the same time; the improvement of the public roads. We had, upon actual count, something like thirteen hundred different road laws in that State. Some townships had one supervisor, and some had fourteen. There was no unity of system; the legislature had been trying to get together on the public road question for years. We made up our minds that the time had come to go out into the country and educate the people upon the road question. We prescribed that the afternoon sessions of every institute held in the State should take up the consideration of public roads. A campaign of about six years was conducted over that State until the people had threshed out this question and had come to a conclusion about it. There was no throttling of discussion; opportunity was given to every man to tell what he had to say.

The effect was that the legislature last year, in the State of Pennsylvania, passed a satisfactory road law, appropriated six millions and a half for public roads, and established a Highway Department, the superintendent being a member of the governor's cabinet. This was brought about through the education that was given the country people by the farmers' institutes.

Here are two instances that have come under my personal observation, showing the power of central control and of consolidated organization. This consolidation does not mean that the localities shall give up all of their power to this central authority. It simply means that we shall do in a degree that which we did when we organized the government of the United States, or conferred sovereignty upon the State; we gave up merely a portion of our rights to these governmental powers for the sake of the better administration of our affairs. The States gave up a part of their rights to the general government for the protection it could thereby throw around them, and they retained so much of their individuality as was necessary to make their home government effective.

Central control in institute work gives power to the institute organization to take up any great fundamental truth of general interest or importance, and bring it promptly and effectively to the attention of the people of a State. This is a most valuable power to possess, whether it be exerted for schools, roads, or agricultural improvement in crops animals, or methods of culture.

There is another thing that central control accomplishes. It secures better institute teachers, and elevates the standard of work. The life of the farmers' institute is in the teaching. Your institute will not rise higher than the ability of your teachers. If you have third-rate teachers, you will have third-rate institutes; if you have high class teachers, you will have high class institutes. If the school in your locality has a first-class teacher, you will have a first-class school; its grade depends on the teacher.

The organization of the institute under central control enables the State Directors to select competent men for institute service. The teachers that are to give instruction must be men of superior attainments. One of the most serious difficulties is to know where to get such men. Where there is a central authority the opportunity for becoming acquainted with men of ability and for securing their services is greatly increased, and you are able to bring into your work the very best instructors that the country contains. It enables them also to so organize the work in the several districts that the lecturers can be used to the best advantage. The meetings can be arranged to come in consecutive order, and more committees have the advantage of the teaching of your most capable men. Men of the quality needed are very scarce. In order that their services may be utilized to the best advantage, it is necessary to have the work so distributed that they can go from point to point with the least amount of travel; whereas, in the go-as-you-please method, institutes frequently conflict with each other. There is no co-ordination and the result is that many institutes are left without competent teachers when a slight change in dates or places would have enabled all to be supplied.

There is another thing that a central organization can do. It can select men specially qualified to discuss the questions that are of paramount interest in the several localities. In our State we have a great variety of crops located by districts. We have the market gardening districts, the dairy districts, the grain-growing districts, and various other kinds of agricultural interests scattered through the State. An institute is held in the tobacco district, we send a tobacco expert there. We do not send that same man into a dairy district, but select for this a man skilled in dairy matters, and in like manner to the others. One man can arrange for supplying all of these various interests far better than twenty, a necessary practice where the go-as-you-please method prevails.

In Ontario by means of the centralized system they have changed the whole character of the swine industry in four years. The swine breeders became convinced that the bacon hog was the hog for Canada, because investigation showed that the English butchers were willing to pay more for bacon than for lard. They took up the matter in the institutes, and taught the members of the lecture force the kind of bacon that the English market preferred. They had hogs both of the bacon and lard types brought to the institutes, and diagrams of slaughtered animals were prepared and exhibited until the farmers were thoroughly acquainted with what was required. Today the farmers of the entire province are sending bacon to England.

Agriculture has within fifty years become a scientific calling. There was a time when anybody could farm; now it is entirely different. A man must know something of chemistry; something of the principles of plant life and growth; he must know about animals, their diseases and the qualities that go to make the animal valuable. It has become a scientific occupation. The reason some farmers are distressed today is because they do not understand their business. We know of a great many men leaving agriculture because they cannot make a living at it. I do not know as this is true out here where your land is fertile, but go into some of the Eastern States where lands have lost a large part of their original fertility, and it takes a capable man to farm. But the time is coming here, as elsewhere, when men will have to take care of the future, when the capital deposited in your great agricultural banks will begin to be exhausted. You, too, will get into the same condition as men are now in the East and South unless you avail yourselves of the information that science affords.

Practical men are very valuable; we all agree upon that. But the practical men of the country are not the men who have brought about did not know about a balanced ration; we did not know about the silo, the progress in agriculture that we have today. During all the centuries we have had practical men; just as good as any of us, thoroughly capable, and yet the great advance that has been made in agriculture has been within forty years, and we are indebted to science for most of what we have. We did not know about the Babcock test forty years ago; we we did know about commercial fertilizers in any very accurate way forty years ago. I could go through a list of fifty important improvements that have come to us with the last twenty years, and for which science is responsible.

Secretary Wilson went to Texas the other day and found there an insect that threatens the destruction of the cotton crop of the United States, and has asked for $500,000 to assist in its extermination. In Boston a little insect escaped from a scientist's window into the forests, and now threatens the destruction of all forest growth. The Hession fly is all over this country. In a great many districts around here they used to grow wheat; you are not doing it now. We have constantly new problems confronting us that we must meet or abandon our calling. We cannot look to practical men for relief. Science must aid us.

The fact is science is now planning to locate a man on a piece of ground and keep him, and his successors, on it for the next thousand years, and to make it possible at the end of that period for that land to be a little better than it is today and have been a perpetual source of profit and support to every generation that possessed it in spite of drouth, and flood, and insect enemies, and fungous diseases. This will require scientific work in agriculture. With you, where things are so favorable and where lands are new, and your wealth is just at hand, to be had for the taking, any one may still be able to farm, but the time has come over a great part of this country when it is a serious question to know what men shall do to secure profitable crops.

The agricultural experiment stations, the agricultural colleges, and the National Department of Agriculture are all at work endeavoring to solve the agricultural problems that arise to vex the man behind the plow, and the institute will take the information which they secure and hand it out to the toilers in the fields who have neither the time, training, or opportunity to study these questions for themselves.

I believe the institute is destined to be the great school of agriculture of this country. Last year over nine hundred thousand farming people attended their meetings. Over three thousand institutes were held throughout the United States. Institutes were held in all of the States and Territories of the United States, except six; three Territories and three States; and the three States have agreed that they will hold meetings this year. When that occurs there will be farmers' institutes in every State in the Union. They are as a rule organized upon the central control plan. A few States only have the admirable arrangement you have for local organization.

The work has been taken up by the agricultural colleges and experiment stations, so that in twenty-one States the institutes are controlled and directed by these institutions. In a large number of others they are in the hands of boards of agriculture, or special institute boards, or under the direction of a commissioner of agriculture. Last year there were over nine hundred teachers engaged by the State Directors. In addition to the men who were selected by the local managers, the States had in their employ over nine hundred lecturers. In taking the names of one hundred of these lecturers from the top of the list, forty-three were found to be college men, fourteen had normal or high school training, and the others, almost without exception, were men who had special opportunities for knowing about the particular things that they were sent to teach.

You can see the great influence this corps of teachers is going to have on the agriculture of this country—nine hundred skilled instructors teaching in farmers' institutes, embracing over four thousand days, which would equal a course of study continuing for twenty-seven school years of one hundred and eighty days each. The institute is coming to be the great educational go-between, between the colleges and experiment stations on the one hand, and the practical farmer, who needs information, on the other. The great teaching force that is to take truths relating to agriculture as fast as they are discovered, and bring them out to every hamlet where men are engaged in farming, and show how they can be advantageously applied.

For the institute to do this work most effectively it will be necessary for the system to be so organized that there may be united effort in every State and by all of the States, guided by intelligent direction, the entire force concentrating for the accomplishment of the results that the farmers' institutes were intended to secure, the dissemination of agricultural information to the people of the United States.

A MEMBER: Where are you going to get these men, these teachers?

MR. HAMILTON: We have got to raise some of them. The method we pursued is this, and I believe it is a good method. We went to our Agricultural College and Experiment Station and got some men there. Then we had our institute managers in the various counties make reports with regard to men they thought were specially well equipped in some line of agriculture. Then we have our institute lecturers look out for men that seem to have an ability to present things clearly and intelligently. Then the next year we took some of these man and put them on the State force, so that they would have a chance to develop. We send them around, give them an engagement of perhaps two weeks and watch them and see how they get along. You can not take a man, and if he breaks down one day, reject him on account of that; give him two weeks, and then, if he looks as though he had in him the making of an institute teacher, then keep him; and so you add to your force year by year.

A MEMBER: And you can't employ them only about three months in the year.

MR. HAMILTON: That is true; it usually is about three months.

A MEMBER: Don't you find a whole lot of scientific fellows who can not make connection with the farmer's mind?

MR. HAMILTON: Yes and no. I will tell you what has been done. There was the greatest opposition to the Agricultural College and Experiment Station in our State—that is about eight or nine years ago—the State board was opposed to it and all were opposed to it. I was made the first institute director in our State; and the secretary said to me: "You don't want to talk about the State College when you go out in institute work." I said: "That is just one of the things I am going to talk about all over this State; that is what I want to do." I went up to the college and I said to the president: "See here; I want an open card in this whole establishment, and whenever I want a man, you must send him to me; I am in the hole; I haven't got enough men to do the work." He hesitated some; but they knew me; I told him I wouldn't abuse the privilege. We went out into the institute work and I sent for the men. The first time I put in five and a half months' solid work in our State and got to knowing it pretty well. I would get up to an audience and say something like this: Now, here we have got a great institution in the central part of the State, spending a whole lot of money. I want to know who has been benefited by it; you people hold up your hands. Then I said, there is something the matter, either you are wrong, or they are wrong, that is clear. Now, if you are wrong, you ought to get right, and if they are wrong, they are wrong in one of two ways; either they are not doing the work they ought to be doing, or else they are not publishing it; if it is not right up there, let us make it right. Now, I says, I have brought one of those men down here; I am going to stand him up on this platform and I want you to take notice; I want you to listen, take notes and see what he knows. The man gets up and tells his story; he is telling an interesting story. I would say, hold on now; we want to know if anybody who gets up like that, we want to see whether he knows anything outside of what he has been telling you. I will ask a question; and pretty soon it was discovered that there was a man who knew a whole lot more than they did. They got, after a bit, to asking questions for infor-

IOWA DEPT. OF AGR'L
C.H. GARDNER BLANDINSVILLE ILL.
for

Trophy awarded at the Iowa State Fair of 1903 to C. H. Gardner, Blandinsville, Ill., for "Grand Beef Herd."

mation; they were getting information that was of value; and it went on that way, until we put five men every year on every force; five forces of men from the State College and Experiment Station. What happened? Why, two years ago, thirteen of the grange alliances met at the State College in convention and agreed they would go before the legislature and ask for a building for that institution for $100,000. It went into the committee of the house, but the chairman happened to be opposed to the college, and so it didn't come out of the committee until very near the close of the session, when the House agreed they would bring it out for consideration. The committee got wind of it and reported it with a negative recommendation, in which event it took two thirds of a vote to pass, and they didn't have the vote. What did they say? They said: you can pass no more legislation from this on. The University of Pennsylvania came up for $50,000; they knocked it out. The result was they had to adjourn; and then they asked: What do you want? These gentlemen said: We want the State College bill ernor vetoed it, and then two years passed, when they went in put back and passed. It was put back and passed. The Gov- for $200,000—we are going to dedicate one of them the eighth of January. These people got this appropriation by simply going to the Agricultural College and Experiment Station and getting men to go out among the farming people to teach them what they knew. That is the right way. I believe, if these agricultural colleges and experiment stations become favorably known throughout their own State, they become serviceable to the people. The trouble is, we are putting out very valuable bulletins to our farmers and they do not read them; they get tired of test work. What we are trying to do now, is to get men who do read them and go out and tell in a few words what is of service to you and me, and in that way we get it.

Down at Washington in this great department, there are four thousand two hundred men in connection with it. Secretary Wilson is at the head of one of the greatest educational institutions—he is one of the greatest men—he has done more for agriculture than any other man I know of that has ever been in our country. Last year over nine hundred publications went out from that department, on agriculture; there were over forty-five thousand pages; there were over eleven million separate documents sent out. There were six and a half million of those that were specially prepared for the farmers. How many did you gentlemen get?

A MEMBER: I got a wagon load; I never used them.

MR. HAMILTON: The farmers institute has got to take the knowledge these publications contain by word of mouth to the men who need the information. This is the great mission of the institute teacher; to take the scientific knowledge and distribute it among the men who need it.

A MEMBER: I would like to ask about what per cent of the farmers—where an institute is held—come to the institute?

MR. HAMILTON: That depends on the size of the hall. If the hall is big, there will be five hundred or more; and it depends upon what a man has to say.

HENRY WALLACE: Of course, I came in during the address and did not hear all of it. I am a little bit interested in this talk of the consolidation of institutes. That question came up fifteen years ago when the first institute organization was held in Iowa. Secretary Wilson and I were there and we made a determined fight when this institute bill was passed to get a central system; we absolutely failed to do it. We agreed to wait and see how the thing would work out. Now, I have had a pretty large experience in the institutes of this State and in institutes of other states adjoining, except Missouri, and there are advantages on both sides. I find, when I go to Wisconsin or Minnesota, where they have this regular institute system that the farmers do not take the interest in it they do here in Iowa. They go there and open their mouths and have information pumped into them; they are like a calf you are trying to feed. But you trust the calf you are trying to feed and when that sucks, you have got the difference between the Iowa and other systems. They all have their own way in Iowa.

Let me tell my friend, when he meets an Iowa institute, he will meet about as big a batch of men and as intelligent a body of men, and the man that can stand up before an institute, must know his subject, or he will never be at that institute again. I would rather stand before anybody else than an audience of Iowa farmers talking about these things with which they are familiar.

I am not satisfied with the present situation. We are gradually getting around to group our institutes together, so as to save labor. There are very few men in Iowa who are able to do institute work; that is a very serious problem. There are not very many men who are scientists who can make the proper connection with the farmer's mind.

I would like to see a central organization in this State; yet, at the same time, I do not want to give up this initiative in the different counties. There are counties in this State that can get up a splendid institute and not have a man there from the outside. Now, since Professor Holden has stirred them up on the corn question, they all want him. One of the best institutes ever held was one I didn't go to; I telegraphed them I couldn't come. They had some of the very best papers there I ever read.

I never knew a first class institute in my life that didn't have a woman there. If you can get the girls there and the boys; the men will come; we must get the two together.

THE PRESIDENT: The next subject on the program is entitled, "Live Stock at the Louisiana Purchase Exposition at St. Louis, in 1904," by Hon. F. D. Coburn, Chief of Live Stock Division of the Exposition.

Before reading his paper, Mr. Coburn said: For reasons which I perhaps mildly suggested this morning, I have had to have my piece written out. I will say, it is not near as formidable as it looks. On the one hand, I am glad to be here; on the other hand, I feel guilty for breaking into this meeting at such an interesting time, or appearing perhaps to interrupt the regular procedure and discussions. But I think your officers fully understand that I am not here on account of any solicitation of my own.

LIVE STOCK AT THE LOUISIANA PURCHASE EXPOSITION. ST. LOUIS, 1904.

F. D. Coburn, Chief of Department of Live Stock, Louisiana Purchase Exposition.

The Department of Live Stock of the Louisiana Purchase Exposition is just now beginning the tenth month since active work was commenced upon its official classification. Inasmuch as the live stock show will not last throughout the exposition period, but will open on August 22d and close November 5th, the Department was not organized until some time after the work of the other exhibits had been well under way. This does not imply that the management had not given full consideration to the importance of the live stock industry, for quite the contrary is the fact.

It is not only that St. Louis is practically the geographical center of the great live stock producing area of the globe, or that in connection with the celebration of the acquiring of the Louisiana Purchase territory especial importance must be attached to the development of the live stock industry in the United States, although these in themselves are excellent reasons for giving more than secondary recognition to animal husbandry; but outside of special claims the importance and magnitude of the industry in this and other countries make it just that live stock farming should receive consideration at the hands of the Universal Exposition of 1904 on a larger and in some respects newer basis than that accorded at any former international exposition.

No stockman has reason to be disappointed with the action of the exposition authorities, for the allotments made for live stock are in many ways on a scale unknown at previous world's fairs. An independent department has been created and more than a quarter of a million dollars set aside for cash prizes. With this substructure to build upon it can not be said that the World's Fair directorate have not offered opportunity to set new marks and new standards in the history of stock displays.

It should be borne in mind that an exposition of universal character is the display in miniature of the useful activities of civilization. Nations from the four quarters of the earth are already preparing their headquarters on the World's Fair grounds. The Chinese buildings are distinctively Chinese, not American; Brazil's lofty structure was designed by a Brazilian architect; the landscape effects around the buildings of Great Britain, France and Sweden are peculiarly the work of gardeners from those countries. The World's Fair is a cyclopedia at first hand, wherever possible. As nearly as may be the progress of the world and the manner in which progress is being made will be actually shown. The Fair of 1904 is to be a workshop rather than a library.

This means, of course, that a great many varied interests must receive attention. Two square miles afford large grounds and five million square feet of floor space would lead one to believe that all who come will be cared for. Yet the problem resolved itself some time ago into the placing of only the best and most representative of its class rather than of getting the exhibit space filled. No one at this time can grasp the immensity of the undertaking at St. Louis; even those who are daily engaged in its building will hardly realize its magnitude until after the first months of the Exposition. The preparation period has advanced far enough to permit it to be said, without boasting, that in achievement as well as in size the Louisiana Purchase Exposition will far excel its greatest predecessor, the Columbian at Chicago. Not only in its size and in the expected results but as much in that which is not looked for, will the Universal Exposition of 1904 be notable and surpassing.

I have wandered off the ranch in this fashion because it is important to emphasize that the World's Fair makes a special call upon the friends of animal husbandry to show to the world what there is of good and of improvement in that industry. By practically doubling the largest cash amount ever before offered for live stock prizes and in other ways making its recognition of live stock wholly unprecedented, the exposition management has set a responsibility upon us from which we may produce results to be proclaimed to all the world. An opportunity so great and so far-reaching has not previously been presented to the stock breeders of any country.

It is safe to say that not many who will see the World's Fair live stock show in 1904 will live to know its records as relegated or its standards replaced. "At St. Louis in 1904" is a phrase more epoch-marking than either you or I can at this time comprehend. The live stock show at the Philadelphia Centennial had the same ground area that is planned for the show at St Louis, thirty-five acres. Live stock figures that are now daily commonplaces were then scarcely dreamed of, yet we have lately had about us the first stirrings of a movement in the agricultural world more revolutionary, with more of permanent change, and more beneficial to the whole earth than any one has conceived of. You know there are what are sometimes termed phychological moments, which are not supposed to occur with the monotony that characterizes one's household expenses. If it be proper to predict the striking of a psychological moment I may be permitted to record my belief that the live stock show of the Universal Exposition of 1904 comes at an opportune time. When the events conspire and the program of ample scope is made ready for them it must take some mishap to prevent an exhibition long to be remembered.

The provision made by the management has permitted the offering of live stock awards aggregating, in the preliminary prize list alone, more than fifteen thousand in number. These are divided among six divisions, which will be shown at succeeding intervals, beginning with horses and closing with the poultry and pet stock. Each will be a great live stock exposition in itself. We are planning space for at least three thousand horses, and for the same number each of cattle, sheep goats, and swine, and for about ten thousand fowls and smaller animals. animals.

The classification prepared has been gone over with great care in an effort to give to each breed or variety recognition in due proportion to its accepted usefulness to man. The plan has been consistently followed of giving the animals more widely recognized and of greatest utility a larger allotment than those which have not so generally proved their usefulness. In doing this rank has been accorded based upon statistics as to numbers and values furnished by those most competent to speak concerning the breed under consideration. This is in some respects at variance with the customary practice, but I think is based upon sound reasoning. A live stock show of the magnitude of that to be held in St. Louis next year will be unworthy its opportunities if it fails to make some new standards and yield new precedents. Whenever occasion arises for a change of this sort the step is not taken until it is clearly evident that the new precedent or readjusted standard makes for the advancement of animal husbandry.

In regard to the details of the classification I shall not weary you with any soporific statistics, but a brief review of some of the newer features in each division will doubtless have a value. Horses, asses and mules form the first of these six divisions. The mule, while last named, does not by any means possess an obscure classification. In the last decade and in previous years he has by his sturdy performance, whether in war or on a railroad contract, proved himself worthy of a luster about his head as well as at his heels. His patient usefulness has been recognized in the World's Fair classification in arrangement of awards that has received the full commendation of his best friends. The horse for business, war or pleasure has been been given greater attention than is commonly allotted him. The market class of horse has a place entirely equal to his usefulness. Roadster, harness, business and saddle geldings and mares; artillery, cavalry, coach, draft, express, fire department and omnibus horses and ponies in harness have special classes and liberal awards. This is not in any way at the expense of the breeding rings, in which the sum of $80.000 is apportioned.

Twenty classes of cattle are given place, from Shorthorn to buffalo and catalo. The dairy test is retained and enlarged, and in addition are features to demonstrate the merits of the cow in beef production as well as dairying. Sheep, goats and swine all have the usual prizes enlarged and new classes added. The Angora has made his way nearer to the front in late years and his larger station has been duly recognized. Fowls and the smaller animals will have opportunity to compete for upwards of seven thousand five hundred awards. The Department of Live Stock has in its province arrangement for the display of nearly all animals and fowls of domestic utility to man, but no matter how much money might be placed at our disposal it would be impossible to give entire satisfaction to each of the varied interests concerned. We have tried to be as exact as possible in making just provision according to the knowledge obtainable.

Throughout the classification an especial attention has been paid to the skill of the breeder whose attention to the progress of animal husbandry makes possible the winnings of the exhibitor. The breeder.

wheresoever located, through whose efforts the best animals in any breeding class may be shown, will secure acknowledgement of this from the Exposition. Thus, in case the largest aggregate amount in the Percheron awards should go to animals bred by a Frenchman owning none of the horses on exhibition and perhaps not even in attendance at the World's Fair, he will receive an award in the form of the premier championship as a breeder of Percherons, proclaiming the recipient to be the winner of an honor above all others in his class. This is outside of all awards to exhibitors, for whom the premier championship as an exhibitor has also been provided.

Particular care is being taken to provide for the selection of judges concerning the integrity and the justness of whose awards there may be no question or suspicion. All prizes in the Department of Live Stock will be awarded by individual judges or the "one-judge system," and the judge making the class awards will confer the championships for the same breed. All judging will be by comparison, and the awards made will stand. Selection of judges will in all instances be governed by their special qualifications and their intimate knowledge of the characteristics and qualities that make valuable the breed upon which they will give judgment. They will have definite instructions to bestow prizes only of such grade as merit fully justifies. Absence of competition will cause no exceptions to this.

A feature that is novel at a World's Fair, although popular and well-established at the State fairs, will be the public sales to be held in connection with the Exposition live stock show. These will be conducted by the association representing the breed under sale, and during the period in which that breed is on exhibition. An encouraging number of applications for the holding of these sales has already been received.

I have touched upon only a few of the features of interest about live stock at the Louisiana Purchase Exposition, but if you are interested in the details and have not received the preliminary prize list giving the classification and rules and regulations of the World's Fair live stock show, I shall be glad to send it to you if you will drop a line to me at St. Louis. Our friends, the farm press, have been kind enough to give considerable space to the plans for the show, and undoubtedly you have already learned from them much that I have suggested here.

I have not said much about the World's Fair in a general way or of the innumerable exhibits in preparation for your delight and instruction, because I notice that you are to have the pleasure of hearing Mr. Conaway at the Capitol tomorrow, and as he is one of your home folks I feel that this should be left for him. For fear that his modesty may cause him to overlook an important matter, perhaps I ought to say that it is generally agreed at the World's Fair grounds that Iowa has, as she deserves, a magnificent site and a building among the best of the many clustered on the Plateau of States.

I do not need to say that the men by whose enterprise, patriotism and money the greatest of all Expositions has been made possible, as does our nation at large, expect much of its best that is attractive and compelling to come from imperial Iowa, and that her sons will achieve at St. Louis victories no less brilliant than those they have already achieved in the fields of war, diplomacy and statesmanship.

THE PRESIDENT: The next subject will be "Alfalfa," by H. M. Cottrell, of Odebolt.

ALFALFA IN IOWA.

H. M. Cottrell, Odebolt, Iowa.

Your speaker has spent twenty-one years in Kansas, nine years of the time with the Experiment Station, and had the opportunity to study the habits and requirements of alfalfa during all the time. He has spent the last eight months only in Iowa, and his recommendations in regard to alfalfa for Iowa must be taken as being based on observations during this short period, coupled with a long experience under other conditions of climate.

The conditions demanded by alfalfa are a perfect seed bed, fertile soil and freedom from weeds at time of seeding and good drainage. It is probable that alfalfa will do best in Iowa on the naturally well drained fields, and when the land is sufficiently rolling to afford good drainage may be expected to do well under proper treatment. Alfalfa needs a good supply of lime and is short-lived in sandy soils. It is probable that alfalfa will do well on many level lands where tile drainage has put the land in good shape. Alfalfa will not grow with wet feet, and the land must be well drained either naturally or artificially. On close soils alfalfa sometimes kills out in low places, and small depressions where water stands. Rolling, well-drained lands, such as are found in Sac and Ida counties, give every indication of being well adapted to alfalfa.

CROPS TO RAISE BEFORE SEEDING TO ALFALFA.

With land that has been under cultivation for many years crops must be grown that will free the land from weeds and put it in good mechanical condition. Barley, oats and millet may be recommended for Iowa, followed by fall plowing thoroughly done.

The best crop to raise on land before seeding to alfalfa is some legume like clover, Canada field peas, soy beans or cow peas. The legumes have the double value of putting the land in good mechanical condition and of adding nitrogen and vegetable matter to the soil in the form needed by the young alfalfa plants.

Red clover is a good plant to grow before seeding to alfalfa on soils that have a subsoil which holds water and prevents good drainage. Red clover is much more vigorous than young alfalfa and will grow down into bad subsoils under conditions that will kill young alfalfa. After the red clover has stood for two years and has penetrated the subsoil to a good depth the ground can be prepared and seeded to alfalfa. The decaying clover roots will keep the subsoil open and well drained and will furnish nitrogen to the alfalfa plant until it reaches full vigor, when it will yield a much larger crop than clover and each pound of the alfalfa be worth considerably more than an equal amount of clover. In several cases known to the speaker red clover has been sown as a nurse crop with alfalfa with good success.

PREPARATION OF THE SOIL.

The ground for alfalfa should be thoroughly pulverized and deeply plowed, but it must be well settled before seeding and only the surface loose. Alfalfa will usually fail if seeded on freshly plowed ground. It is necessary to plow the ground before seeding; plow as early as possible, harrow thoroughly, making a good seed bed, and then wait until a good rain has settled the soil before seeding.

A careful farmer and a careless renter a few years ago put in alfalfa in adjoining fields in northeastern Kansas, where conditions are similar to those found in Iowa. The farmer plowed the land deeply and pulverized it until it was like a garden bed. He immediately sowed alfalfa, secured a thick stand, and in a few months the alfalfa entirely died out. The renter thought it would not pay to spend much time on another man's land. His field had been in corn the previous year. He broke the stalks with a pole, sowed the seed broadcast, and covered it lightly with a harrow. He secured a good stand that was permanent. Usually a good stand can not be secured with so little preparation, but a deep, mellow seed bed at seeding time generally insures a failure. The more thoroughly the seed bed is prepared the better, if it is allowed to settle before seeding.

When fall plowing is practicable the surface should be fixed as for a garden in the spring just before seeding, but the stirring should not be done deeply. The seed bed is the most important factor in securing a stand of alfalfa.

PASTURING ALFALFA.

When alfalfa has become well introduced in Iowa it will be largely used for hog pasture. Where hogs are given a small feed of corn daily while on pasture, from five hundred to one thousand pounds of gain can be put on during the summer on the hogs for each acre pastured, in addition to the gain made by the corn. A suggestion in regard to pasturing may be in order. Alfalfa throws up stems from buds growing in a crown above ground. If this crown is eaten off the plant is either killed or greatly weakened. To pasture hogs on alfalfa and maintain a good stand, divide the field into two parts. Mow these parts alternate years and each year pasture the hogs on the part that was kept for hay the previous year. The stubs left in mowing will keep the hogs from eating the crowns too closely.

RE-SEEDING.

In Kansas we found it much easier to get a good stand of alfalfa on ground where alfalfa had previously been grown than on land that had never been in alfalfa. In sections where alfalfa has not been previously grown it is frequently easy to secure a good stand. After a year or two it then begins to weaken and either makes a feeble growth or dies out in patches. In hard subsoils the roots of the first seeding have a hard time to work their way down, and may not be able to penetrate to a depth of more than five or six feet. when they become exhausted. If, when plants shows signs of this exhaustion, the ground is plowed and another crop sown the roots will decay. letting air into the subsoil, where it can break it up and make it more porous. Thoroughly pulverizing the ground distributes the bacteria which are needed by the alfalfa roots. A year after breaking up the ground should be re-seeded to alfalfa.

The plants from the second sowing will find the ground prepared for them in the depth which the roots from the first seeding penetrated. By the time these plants have reached subsoil that has been untouched they will have reached an age and vigor that will enable them to further extend their growth and to yield well.

SEEDING.

Seeding in Iowa should be done in the spring after the danger from hard frosts is over. On Brookmont Farm we seeded sixty-five acres April 24, 1903. and secured a good stand. Severe frosts will kill alfalfa if they occur just as the first two leaves appear.

We recommend twenty pounds of seed per acre. With every condition favorable, experienced alfalfa-growers sometimes succeed in getting a good stand by using ten to fifteen pounds of seed per acre. but this small quantity is not generally sufficient. It pays to use enough seed to secure a good stand. as alfalfa, unlike clover. never thickens. and the number of plants per acre tends to continually decrease.

The most even stand is secured by sowing with a broadcast seeder and harrowing lightly.

Alfalfa should be sown alone. It does not want a nurse crop. Sometimes a good stand is secured when alfalfa is seeded with some other crop, but many times it fails entirely. Young alfalfa is a delicate plant and needs all the plant food and sunshine available and usually when it has to share these with another crop it dies.

TREATMENT AFTER SEEDING.

The young alfalfa is one of the weakest plants grown. It grows slowly. is a weak feeder. and is easily checked or killed by weeds and by unfavorable conditions of soil, weather or treatment. Mature alfalfa is a most vigorous plant. It grows down deeply in the soil. is a vigorous feeder, and lives and yields well under many unfavorable conditions. For this reason it will pay well to give the baby alfalfa plant good care and favorable surroundings for the first year of its life.

Young alfalfa responds most vigorously to a top dressing of fifteen to thirty loads per acre of manure. This top-dressing is of special value when done after the ground is frozen in the fall after seeding. as it checks the alternate freezing and thawing that causes leafing, Young alfalfa must have a fertile soil.

Alfalfa should be run over with a mower three or four times the first season to keep the weeds down. The mower should be set high. and the weeds mowed so often that when cut and allowed to remain on the ground they will not smother the alfalfa. Some good alfalfa growers mow the alfalfa three or four times the first season when there are no weeds, as they find that the pruning of the young plants makes them more vigorous. The cut vegetation should be left on the ground to act as a mulch. If mowing has been delayed until the weed growth is heavy, it is often necessary to cut the weeds, rake and take them off the ground to prevent smothering of alfalfa.

No stock of any kind should be allowed on alfalfa the first year of its growth.

Cutting acts as a tonic to alfalfa. Whenever alfalfa does not thrive. cut it. This applies throughout the life of the plant, from the time it first becomes high enough to cut with a mower, and through all the years of its life. Whenever alfalfa begins to bloom, cut it, no matter how short, unless seed is desired.

Alfalfa should be cut when not more than one tenth of the plants have come to bloom. Cut at the early stage, the yield of hay for the season will be much greater than if the alfalfa is cut near maturity, and every pound of hay secured will be worth more for feed.

The late cutting of the first crop seems to injure the plant more than at any other time, and we have found it profitable to cut alfalfa the first time as soon as one tenth was in bloom, even though the weather was bad and we knew that the crop would spoil in curing. The increased yield from succeeding cuttings over that cut late much more than makes up for the loss of the first crop.

Successful clover growers, the first time they try alfalfa, often ruin the stand. so that it has to be plowed up, by waiting to cut until it reaches the stage at which clover is usually cut.

It is going to be difficult to cure the first crop of alfalfa hay in Iowa. On Brookmont Farm we are going to save straw for the first crop and stack straw and alfalfa in alternate layers. With ordinary weather no difficulty will be experienced in stacking the second and third cutting.

THE PRESIDENT: This matter is now before you for discussion.

A MEMBER: Will alfalfa shed rain?

MR. COTTRELL: It is not a good material to shed rain.

A MEMBER: What kind of alfalfa will soil grow that is gravelly and dry?

MR. COTTRELL: It will die out on gravelly and dry ground.

A MEMBER: In the southern portion of our State, along the tributary streams, draining into the Des Moines river, on land with clay soils, where we drill wells, say one hundred and twenty-five feet deep, although we get surface water at thirty feet, what kind of soil would that be?

MR. COTTRELL: That is first rate, if the subsoil does not hold the water too much.

A MEMBER: What about the alluvial land along the river?

MR. COTTRELL: That would depend almost entirely on the river. Alfalfa will die if the water stands on it; it will kill it out. I think your alfalfa proposition in Iowa is wholly a matter of drainage.

A MEMBER: In relation to seeds, is there any difference in varieties?

MR. COTTRELL: Well, it is practically all alfalfa. Of course, some of these Asiatic kinds have been advertised. I think there is quite a point, as to where you people in Iowa get your seed. In eastern Kansas they failed for a number of years, because they got seed from the southwest from the sandy land, where it has been irrigated. Now, by accident a man got hold of some seed raised in western Kansas, where it was one hundred and eighty feet down to the water, and he got a perfect stand. The result was, in that section of the country, they have been having wonderful success the last five years. I would recommend for this section of the country that you get your seed from Nebraska, if you can; if not, I would go to the irrigated regions of Utah. There is scarcely enough seed grown here in this country to supply the demand. It will be difficult to get seed this year. In an experience of twenty-one years, I do not know of a single case where the foreign seed has done well.

A MEMBER: What is the price of seed per acre?

MR. COTTRELL: Ordinarily ten or twelve cents per pound; you want twenty pounds to the acre.

A MEMBER: Going into the northwestern portion of Nebraska, along the Colorado line, where the irrigation ditches go dry in parts of the season, would a person have success there?

MR. COTTRELL: I do not know. There is no account of it, where there is no irrigation at all.

A MEMBER: The impurity of the seed is another thing; we get foxtail mixed in it.

MR. COTTRELL: Buy of reliable men. That is the greatest test to a man not familiar with it; the only thing to do is to buy of a man he can depend upon.

A MEMBER: Did the Lord ever make that kind?

The convention here adjourned until 8 o'clock P.M.

EVENING SESSION.

THE PRESIDENT: The evening session, according to the program, will be devoted entirely to good roads. We are very fortunate in having with us a gentleman who will address you tonight on this subject. Good roads is something we all need, something we are all interested in. I have been identified with the movement for some little time in a small way. After the address you are free as ask any questions you may desire. The first speaker who will address you is the Hon. W. H. Moore of St. Louis, president of the National Good Roads Association.

REMARKS BY MR. MOORE.

Mr. Chairman and Gentlemen:—It certainly gives me pleasure to meet you here again as the agriculturists of this State. This is the third time I have been in Des Moines in the interest of good roads. In coming to your meeting today I had to travel over a thousand miles; I have come from Texas; had a convention down there. I promised and wanted to be here.

I notice some things here which I think I would correct. If I were you, I would extend an invitation to the farmers' wives. I was very much pleased this afternoon, listening to Mr. Henry Wallace, and to hear him say that we find the institutes the most successful where we find a large number of women. I would not confine myself simply to the wives, but I would invite the daughters and boys.

This afternoon, talking to the Governor, I remarked that you had not very many members here. No, he says, but most of our people are feeding Iowa people, and a large number of the people of Chicago and the nation.

I want to compliment your agricultural papers in this State. Now, I have thirty-four agricultural papers that come to my desk every week, and with all the multitude of affairs—and we are not idle by any means—we have not yet got to the Philippines, but we have got as far as Hawaii—there are only forty-two agricultural papers published in the United States. In none of the states—and I said this at Cleveland, Ohio—do I find a more representative class of agricultural papers than I find in Iowa. I do not know where you gentlemen live, but you take these papers and allow your children and wives to read them. I take them and send one to California to my sister, and one to Canada. If I miss them any week, they will say, where are these papers? These subjects that are discussed here today; the question of organization which Mr. Hamilton spoke of; the matter of live stock interests at the World's Fair, by Mr. Coburn; all the matters these gentlemen have referred to, you will be more or less touched on in these weekly papers. Now, gentlemen, you take these papers; they will be a Bible in your household; there are some Sunday school lessons in them that it will do you no harm to read.

I also desire to state that I am watching closely what you are doing. I want to compliment your Governor. He delivered one of the best messages of all the governors, and we had governors of thirty states inviting people to consider this road question. I am sure he will be with you for the best interests of the State.

I am also glad to see your commercial organizations taking such an interest in this matter. I am glad to see what Mr. Lyons has done, also Mr. Milo Ward—I am not going to forget him—because when we came here first, I know something of the work he done; and I want to congratulate Mr. Lyons on the work he is doing. He is doing it out of his own pocket, the same as I have done for fourteen years in these road matters. I have never come to the point where they gave me one dollar of salary and I do not suppose I ever will. Mr. Lyons is doing the work which enables you to get at the ideas you want to present to your legislature; he is perfecting an organization.

This institute is called for what purpose? I must congratulate the gentleman who spoke here today; I was very much pleased. Without organization none of our institutions can be successful. You do not have a railroad corporation; you do not have a street car company; you haven't a bank, school or insurance business, but what are organized. When it comes to this subject we are speaking of, the subject of Good Roads, you have no organization in this State.

There will probably be thirty or forty bills presented to your legislature soon to convene. Some of these bills will be good, and some of them not. Are you going to pass these thirty or forty bills? You can't do it. Then how will you obviate these thirty or forty bills? The only thing to do is to organize. The keynote of organization is the bringing of people of rural districts together, and to join in some feasible plan; then go to your legislature and say to them: Here are ninety-nine counties in Iowa; we banded together as an organized force, and we ask you to enact this bill. If you do that and come down to the next legislative session in January and February and adopt some bill, I believe you will enact it into law.

I am going to state to you gentlemen what I think would be feasible and what would be the proper steps to take in the coming legislature. You passed a bill at the last session of the legislature. I know that some of you are opposed to that measure; I know a number of you are favorable to it. I understand there will be proposed a proposition to repeal that measure. I have given that matter close study and I have sent ten thousand copies of this circular over the State and to road officials and to the people, outlining and explaining the merits of that bill, what the measure meant. There were practically only two changes in the previous bill; one was that you pay your taxes in cash and that that tax goes into a separate fund which can be used as any other fund, only for road purposes; the other was doing away with your road supervisors. The road supervisors in these counties would naturally object to any plans that would remove them. I think a large number of the supervisors are good men; some of them are not.

I want to say to you that we are spending nearly three millions of dollars in Missouri under the supervision of fifty-two road officials, and the system has been carried on for the last thirty, forty or fifty years, and it isn't giving us any good roads either. Therefore, I am in favor of the present law that pays the tax in cash. You have noticed that in a large number of the counties the books are kept in a haphazard shape. You couldn't go into your counties previous to this law and find out where the funds went. No fund should be appropriated by the tax payers of this or any other State, unless you know where that fund goes and for what purpose it is used.

Now, as to the bill that should be enacted by the coming legislature—I am speaking now from experience; going about these different States, investigating their laws, and having seen what they are doing in these different States. New York is spending nearly two millions a year; that is, the State itself is spending out of its own funds nearly two millions to aid the counties in that State in road building. I want you gentlemen to understand it don't make one bit of difference to me whether you take the pro or con side of this bill; but I am just as anxious to see Iowa put on her statute books a progressive road law at this session as I am to see Pennsylvania appropriate six and one half millions for road purposes.

I believe, gentlemen, we are on the right track when we ask you to support the State Aid Bill. It is a bill that provides that a certain fund out of the State treasury be divided among the several counties in proportion to their population or assessed valuation—it is assessed valuation in New York—providing the counties and neighborhoods shall put up an equal amount. What I mean is this: The State of New York appropriates two millions a year—we will say for ninety-nine counties—that will be divided in proportion to their population. The county making the first application is the first one served. Now, if you should allow the State Aid Bill to pass and do not make your application, you will not get any money. The county that did make the application would get the money, that is, pro rata to your county. But, if you make an application you must do this: the county in which that road is located must put up 25 per cent; the township must put up 15 per cent, and the man abutting on the road pays the balance, 10 per cent.

Now, what do we get? We have the State putting up one half. Who pays one half? Every man that is taxed on the State of Iowa; every man that represents a corporation. Out of the State treasury you put up half. Now, the county which has the road and which it benefits mostly, puts up one third. The plan of the State putting up half, the counties 25 per cent, the township 15 and the man who owns the land abutting on this road puts up 10 per cent. gives you a good proposition.

Now, gentlemen, that bill, I think, should be enacted by your next legislature. In order to make that law effective you should appoint some different power from what you have now. I don't mean your present county commissioners; I don't believe the county trustees would be the exact power to distribute these funds. I think you should do what New York, Massachusetts and Connecticut have done; create an Road Commission. I know some of you gentlemen will begin to scratch your heads and say, well. we have got so many new boards now; they are stealing everywhere; we don't want any new organization. Do you realize that today you are putting up $1,753.000 in that neighborhood. and you have no decent road to your house? Will you tell me why you object to a practical engineer that would be in touch with every single road? Will you tell me why you oppose a man who would be located at the Capitol to direct these roads and culverts sixteen feet and ten feet wide to be built, and to put down burnt clay? If you will do that you will have somebody you can hold responsible.

So, if you enact the State Aid Law, you need a State Commission to disburse this money. I would favor three men, instead of one—one man in the western part of the State. the other in the eastern, and one at the Capitol, and let this man be a practical engineer who will furnish the plans and blue prints that you have today in building your bridges and culverts. Wouldn't it be better to furnish these plans for all the counties in the State?

Without system you can never hope to have great success in your road affairs. The plan you want is organization, first; then agitation and education. and through education you come up to your legislature.

I don't want to take very much of your time; it is not necessary. The law that you should pass should be the State Aid Law. I think you should not appropriate less than a quarter of a million as a starter. If Pennsylvania can appropriate six and one half millions, I know the State of Iowa can start with a quarter of a million; I think some would favor five hundred thousand dollars. Get your machinery in good order before you increase too much.

Gentlemen, there is another proposition I am going to present to you. and that is today we have a large number of men in Des Moines, and in all the cities of the State. who are not working. You are feeding these men; the taxpayers are feeding them. You are subscribing to charities and a dozen things that are inviting these men into Des Moines and the larger cities. You are not pestered with this class of men as we are in cities like Chicago. I will say to you gentlemen we are arresting men, women. boys and girls in the United States which is costing somewhere about seven million of dollars a year, to arrest these people. Do you intend to allow the tramps and vagrants to start from Omaha and come along your railroad tracks and come into Des Moines and demand something of your wife. and if she does not give it, probably knock her down. and in some cases set your houses on fire? I am giving you something that is going to appeal to you. this class of vagrants and tramps that we are today having no law to regulate. You have no law to put them on the rock pile, but you can put them on the earth roads and you can run them out in gangs and you can force these men to assist in building these roads, or drive them out of the State.

The tramps and convicts of the penitentiary should be used in the preparation of these roads. They have no right to come in contact with free labor. We want a law that is rigid enough to take these fellows when they are standing around saloons and picking their teeth; that a policeman can walk up and say, how do you earn your living? and if he can not give a satisfactory explanation, let him assist in the construction of roads. I will say now that I think within five years most of the States will adopt some such law. Then we can take these prisoners and move them out in stockades, ten, fifteen and even forty miles. You will be putting them on the public roads; in the cities you will be cleaning your sewers and streets, and paving them, if necessary.

I will take one thousand of your men that are penitentiary fellows and you give me fifty guards; that is twenty men to a guard, and I will build you a mile of road, sixteen feet wide, eight inches deep; I will put on the gutters and ditches and will also put in drain pipe. We will say we have three hundred and thirteen working days in a year. That means we will start in at Rock Island and we will build a road across the State. In the northern climate it will cost about thirty-five cents per head to feed and handle these fellows; it will cost about two dollars for guards. You take one thousand fellows at thirty-five cents, three hundred and fifty dollars a day, outside of your horses, mules and machinery, and you are getting a mile of road for it that will cost you two thousand dollars, or more, under the present system.

I am looking at this from a business standpoint, not from a sympathetical standpoint. It is a business proposition; we have got to meet it. We have got to furnish work for these people, and we want to build permanently.

I understand your conditions. While I know you haven't stone or gravel in many counties, I know you have clay. I know you can burn that clay and put it down. First grade up your roads. You can grade up your roads for three hundred and fifty to seven hundred dollars a mile. You can put in tile from two to four inches in diameter in all the bad spots in Iowa at seven hundred dollars. If you haven't got stone or gravel, you can turn clay, roll it up and put on your clay, and in five years you can have hundreds of miles of the best roads you have ever seen. After you do that you can put on one hundred and fifty barrels of oil per mile, and after a second application you will have the best roads you ever had; it will shed rain. We tried it over at Keokuk.

On the 30th of March, this year, I was at Santa Barbara. It so happened that Mr. Rockefeller was there, and I got to talking to him. I asked him whether he remembered the oil he gave us. After thinking the matter over a while, he says, yes, I do remember sending that oil. I said, Mr. Rockefeller, it was by you sending us those two barrels of oil that started the railroads to sprinkling their roads with oil. These one hundred and fifty barrels will not cost you over two hundred and fifty to three hundred dollars per mile. So if you have not stone or gravel, you can advocate burnt clay and put that on top and sprinkle with oil.

I want to speak of one other feature. Why is it that our railroads are spending millions of dollars annually to shorten their lines? They are doing it for the purpose of controlling trade. I want to say to you, gentlemen, that in my judgment it will not be long until the territory between here and Burlington and between here and Council Bluffs will be suburban property. We are not going to have such large farms, because the increase in population will demand tnat they should be smaller. The price will be of such a character that you will let loose of your own land. I have been interested in the proposition that is going to bring those changes about—the electric appliances on our electric lines. I see the New York Central Railroad has adopted for fifty miles around New York electrical appliances of four thousand five hundred horse-power on cars. The force of such a car will draw a five-hundred-ton train sixty miles an hour.

I want to say another thing—you may think I am visionary—within a reasonable time all of your great railroads will be operated by electricity. Within five or ten years you will not see a fire engine going through the streets; there will be applicances placed in each block which can be put in operation by the tap of the hand.

I have only given these illustrations to show you what is coming as soon as you get electric lines established. It will not be unusual at all for your electric lines in and contiguous to Des Moines to go at the rate of one hundred and fifty miles an hour. People are not going to live in cities then; they will have their homes out of the city on two or three acres of ground.

Now, I have tried to present two or three propositions—I don't know how many—to you gentlemen. I hope you will go to your homes and that you will come down to your legislature and bear on them for a State Aid Plan in road building.

GOVERNOR PACKARD: What is the cost of making a clay road?

MR. MOORE: From three hundred and fifty to five hundred dollars a mile for the clay burnt. I want to say again, that I congratulate Mr. Hamilton. I was very much and deeply interested in that speech he made. I want to give Mr. Hamilton the credit for passing the Pennsylvania road law; for getting the six and a half million dollars. He stuck to the conventions year in and year out, and that, more than any other influence combined was the cause of the passage of that law.

Do not pass this over. There is too much attached to it; two much education; too much of everything that pertains to the welfare of your State. Do not find fault because you do not happen to get the road down in your county. You do not have the Capitol down in your county, but you contributed to it. You do not have an asylum in your county, but you contributed to it. It is just the same with the roads; be a little flexible. The State Aid Law is the proper law for you to enact at the coming legislature; create a State of Iowa commission, and you will be on the progressive road to improvement.

MR. NICHOLS: The gentleman spoke about John D. Rockefeller contributing these tanks of oil. I don't know whether he pays any road tax in Iowa or not. He passes our house—or his man does—at all seasons of the year and he hauls about six thousand five hundred pounds on a common wagon. He does more than all the farmers put together to cut up our roads. I believe it is time for him to contribute something towards the improvement of our roads. I do not know how much he pays. I hate to see that oil tank come around. He used to have a wooden tank, but he wasn't satisfied with that, there was too much leakage, and now he has got the steel tanks. I don't know whether we get enough out of Rockefeller, or not. I just called attention to this to make you people think of the wide-tire wagon.

MR. MOORE: I am extremely glad to have you bring up that question. I have used that argument a thousand times. If you pass a State Aid Law, then, for whatever interest Rockefeller has in the North-Western railway, he will assist you in paying for these roads.

A MEMBER: I would like to ask if three hundred dollars would make the foundation for such a road?

MR. MOORE: I am surprised that you gentlemen do not first grade up your roads. Why don't you do it? It will not cost you from three hundred to five hundred dollars to first grade up your roads; from three hundred dollars to five hundred dollars a mile. Then it will cost you from three hundred and fifty dollars to five hundred dollars to burn the clay. To put on that clay, it will cost you from one thousand dollars to twelve hundred dollars. All you have to do is to burn that clay, put it on and roll it.

Mr. Wallace: Will any kind of clay do for that purpose?

Mr. Moore: If you have a clay that will make a good vitrified brick, you have got a tremendously hard substance; what we are trying to do, Mr. Wallace, is to teach the use of what we have in our own neighborhood.

A Member: We have heard gumbo recommended.

Mr. Moore: I saw an article this week about hard pan; you have got a great deal of it in this State; that makes the best material in the world, if you burn it and roll it.

A Member: What is the reason you have for believing that the roads which you speak of, that we can not obtain them under our present road law, which is not in full operation yet?

Mr. Moore: The last law, I think, is working very well. This law is not in full effect yet. Now, give it a fair trial; do not go to work and cut it down. You only started in 1903; do not displace it until you give it a fair test.

A Member: I would like to ask what we are going to make good roads of where our soil won't burn, like in southwestern Iowa?

Mr. Moore: You will find these conditions. I find in southwestern Iowa you never grade your roads; you haven't done it. All along down the line you have not a drain tile in the road. How do you expect to get rid of the water. They are as flat as a pancake in most places.

I want to say to you gentlemen, a call is being sent out for the next national convention to be held in St. Louis in 1904. It will be held May 16th to 21st. The 19th of May, on Thursday, will be Good Roads day. There will be demonstrations had there of the different machinery; we are going to build roads there on the Exposition grounds and show you gentlemen how these roads are built. We are bringing people, not only from the United States, but from all the civilized nations in the world. All the great engineers in the world will be there. Will you go along in your own sweet way and tell the legislator how much you love him and let these things go by default? Remember, it costs lots of time and trouble to bring about a great educational feat like this. We are proud that the Louisiana Purchase Exposition has assisted us to that extent.

A MEMBER: We disagree somewhat as to where to put the tiling, as to whether it should go to the side or the center of the road.

MR. MOORE: You wouldn't place a drain tile under your gravel road; it will go on the sides, just where the gravel comes to the earth, you want your drain tile. In the earth road you place your tile in the center of the road.

MR. WALLACE: Suppose you have your tile through the center and that road is traveled until the horse tracks would stand full of water, what good would that do?

MR. MOORE: It won't do any good. If you round up your hardpan clay on both sides to the ditches, you will find that you won't be troubled about the horses going down, because that road will be dry ten months in the year.

MR. WALLACE: Don't you think if we had our roads drained thoroughly and graded up, we would get along pretty well?

MR. MOORE: If you will do that you are putting one hundred and fifty million of dollars in your State in good roads; I will say, you will get along very well. That, gentlemen, is the first step. If you will just take our common earth roads and grade them up and drain them, it will throw this State hundreds of millions in advance. Grade up your roads first; you can't do anything else until you do that.

I would like to say one thing more. I believe you ought to put walks along the fences. I don't think the children going to school today have a fair show. If you would put your walk along the fence, and then your ditch between that and the road, see what you would do for your children and wives. I think later, there will be shade trees planted. Why don't you organize and do it?

I know it is getting late and I will make way for the gentleman who is to speak next. Gentlemen, I thank you for your attention and interest.

THE PRESIDENT: We have a gentleman here tonight, Mr. D. B. Lyons, president of the Commercial Exchange of Des Moines, and secretary of the Iowa Good Roads Association, who has done more for good roads than any other man in the State, and will now address you on the subject.

REMARKS BY MR. LYONS.

I deem it a great pleasure to have even one lady present at this meeting tonight, and I fully agree with what other speakers have said about having the ladies and young men in attendance at these meetings; the ladies, because they have such an influence upon the home and the voters, the boys, because they finally have to help pay the bill for building these roads.

An Iowa Good Roads Association was organized here last April. I see before me several faces of those who have been in other meetings and who are today members of this association. Your chairman here tonight, Mr. Morrow, is one of the vice presidents of the congressional districts. But I imagine that very few of you really know what has been going on in this good roads movement in Iowa, because you have not had a chance to know, unless you have been in one of the counties where our conventions have been held. I want to assure you there is a good deal going on, and I anticipate and predict with entire confidence that it is only a matter of comparatively short time until a perfect tidal wave will cover the entire State of Iowa on this subject, and that it will result in legislation that is similar to that which is now being enjoyed in other states.

Our friend, Moore, has been in the harness for so long, has seen so much, and dreamed so much about it, until he has the idea of good roads permanently fastened in his mind. I want to tell him that Iowa people have not yet gotten directly to the point. We are not yet quite ready, until we know more about it, to vote for the kind of a bill that he proposes; but I anticipate that we may be ready sooner than some of you think, because we are learning more about it every day.

I want to challenge anybody here in this house, or in the State of Iowa, to prove that he knows less about the subject of good roads than I did six months ago; and I do not know much yet, but I have found out that you can, by investigating and reading and by hearing other people tell you things and by observing the experience of other people on the subject, you can become pretty well posted.

While America properly boasts of her supremacy in arts, sciences and educational institutions, she must admit with shame that she is many centuries behind European countries in the important matter of improved public highways.

Probably the chief reason for this lies in the fact that during the past eighty years, during which our chief growth has occurred, the time and energy and money of our people has been largely concentrated on railroad building.

Now that railroads have been builded into almost every nook and corner of our land, the pendulum has begun to swing back and the long neglected country road is beginning to receive the attention it deserves. No single statement can more clearly illustrate how well deserved is this attention than that 95 per cent of all the freight carried by railroads and steamships is first carted over a primary road.

It has been a great mystery to me that our Yankee and American business intellect has not taken a lesson from the builders of railroads and applied it to our dirt road improvement.

Pray, what is a railroad but a road over which to *haul* something? So is the country road.

What steps do builders of railways take in going about the work of construction?

First, they provide for ample cash—two millions, ten or twenty millions of dollars. Then the most competent engineers and most responsible contractors are secured, and everything is systematized, with a view to perfect, enduring and uniform construction.

Why should not the improvement of our principal highways be conducted along similar lines? They will be when the people awaken to the truth, and especially when they learn that the tax they are paying for bad roads is ten times more than they would need to pay to build good ones.

It is a positive fact that a load of 6,270 pounds can be hauled by one horse on a macadem road. That it requires two horses to draw the same load on the best gravel road, and five horses on the best dirt road. I insist, therefore, that the man who is using five horses to draw what only one might haul, is contributing the value and use of four horses, constantly, for the privilege of having bad roads. This is his bad roads tax.

Whenever, as often happens, a farmer is compelled to accept ten per cent less for a product while roads are passable, than he could have secured during a muddy season, if only he could have delivered the product to market, he is paying 10 per cent of the value of that product as an outright tax on bad roads.

The merchant suffers proportionately, as the farmer buys less goods and less of luxuries when he is receiving less for his products.

In short, good roads are an absolute commercial and social necessity to every citizen and should be paid for by everybody.

The New York law has proven exceedingly popular and is a demonstrated solution of the good roads problem for Iowa.

Property abutting on a permanently improved highway is specially benefited by increase in value. Townships and counties are benefited directly, in contrast with those where no such highways exist.

Iowa is ready to act. She is rich enough to proceed without waiting for Government aid. It may be many years; it may be never that Uncle Sam will help us. Let us, then, help ourselves. Let the State pay 50 per cent, the county 25, the township 15, and the owners of abutting property 10 per cent of the cost of the permanent highway. Let the burden be distributed over a long period—thirty, forty or fifty years.

To secure this end, legislation is our only recourse. About twenty-five counties have so far been organized. Our State Association is pushing the further organization as fast as possible. Already we are a power, and should be doubly strong before the next general assembly meets.

Let every one of us return to our homes determined to co-operate in this grand work of organization, and good roads for Iowa will be an accomplished fact sooner than most of us have dared to hope.

A MEMBER: Is it not a fact that the principal difference in this new road movement, as compared with the old proposition, lies in the fact of contribution; that everybody should contribute, or that the Government should aid?

MR. LYONS: Yes. I think you may look up history all you please, and you will find that no nation anywhere under the sun, and no State, has ever builded the kind of highways we are talking about, except through the aid of public funds. It would bankrupt you, gentlemen, to build these roads in front of your houses. We do that in the city, but we have only fifty or one hundred feet to pay for.

The fact is, these roads contribute not only to your personal benefit, but if the citizens of Des Moines today, and if the members of the Commercial Exchange of this city, could only realize what it means to the commercial interests of this State, this hall would not have held the business men of Des Moines who would have been out here tonight.

I have personally attended county conventions in about twenty-five counties of the State of Iowa. We have enrolled about one thousand members since April in this organization, and, of course, the work has been done largely by myself. Senator Harper, our president, has a large force and is doing a good work.

THE PRESIDENT: We will now listen to an address by Senator J. T. Brooks, of Keokuk county.

ADDRESS BY SENATOR BROOKS.

When I consented to give up my place on the program to President Lyons, I had no doubt as to the wisdom of my doing so, and before I have been on the floor very many minutes you will be equally sure that I have done a wise thing. The fact is, I think the best part of my speech was my consenting not to make it. However, if you are willing to stay a few minutes, I will simply talk a little on the good roads question; a question that comes closer to the farmers of Iowa than any other class of men. Primarily, they are the people who are interested mostly in the public roads and wagon roads of this country.

A great deal is being said in these days to attract public attention to the condition of our roads, and nothing that I have heard said, or I know nothing that has been said from the rostrum tonight, in my judgment, which overstates the tremendous losses our country sustains because of inadequate roads. I prefer to come close down to the thing itself in the few moments allotted me, and I have no quarrel with those who advocate National and State aid. That thing may be all right; I simply don't know about it. Then the question is a large one for me. I find in these large aggregations of men, I do not seem to count for much. I find, in some way, that I am a larger proportion of one hundred men than one hundred thousand. I have the same feeling when I approach these figures in regard to the cost of making good roads. It may be true that here in Iowa we can spend one thousand, two thousand, or even five thousand dollars per mile in macadamizing our roads; it seems a very large sum of money. I am not prepared to dispute the wisdom of the matter; I simply know nothing about it.

With us, here in Iowa, of course, it is a very serious problem, because of the absence of road-making material. The combination of elements that have made us the first agricultural State of the Union, has also combined to leave us practically destitute of road-making material; gravel pits are not with us to any appreciable extent. It has seemed to me that in our present condition the expense necessary to be incurred we are unable to meet. I may be mistaken, but it has seemed to me and does now, that here in Iowa we are fortunately not dependent on these high-priced roads. I do not remember of having examined a public highway, however expensively built, that for general purposes was superior to the ordinary road. I am not unmindful of the figures President Lyons quotes us; what one horse can haul, and, my friends, we are not in the condition, I apprehend, of the people who haul these large dray-loads over our city streets, or over the suburbs of our European cities. We have wider stretches; we come with lighter rigs and with more speed and more pleasure than it is possible to get over these harsh, unyielding surfaces. For me it is a matter of regret to ride over these paved streets in Des Moines, and it is certainly not a pleasant thing for our country folks to ride and drive over them.

What is it that spoils our roads in Iowa? It is the excess of water that gives us our bad roads. While I have no quarrel with my friends who are advocating these macadamized roads, it is perhaps right and for the best that we keep in our minds an ideal system, such as they advocate with such enthusiasm; I admire them for doing it. I have thought that we can provide some means or some way of getting the surplus water out of the soil, out of our highways; getting the surface properly rounded; getting our ditches properly opened, to dispose of the excess water, I think we will have a magnificent road system for the present needs of the population. Perhaps time—and it may not be a great time—I am pleased to believe that President Moore is something of a prophet—that we may have all these things in twenty-five years, and that Burlington, Hedrick, Oskaloosa may become suburbs of Des Moines; but in the meantime, while we are waiting for that, I think the proper thing for us to do, is what we can, and I believe the main thing before us is to properly drain our roads.

Let me give you a few instances: One mile north of Hedrick, my home town, where the highway makes a descent south of Sugar creek, the road follows down into a ravine. For years that ravine, during wet seasons, in the early spring time, was almost impassable. During every rain; every time the frost went out of the ground, it was a mud hole. After a long time and after much persuasion, we induced the road supervisor to try and tile it. He leveled up the surface and placed four-inch tile up close to the wheel tracks. That road, one of the worst pieces of road we had in that whole neighborhood, became one of the very best in that neighborhood. It is today, and has been for almost fifteen years, an ideal wheel track; it became hard and compact; the rain or frost seems to have but little effect on it.

About three miles east of Hedrick, Rural Route No. 2, there is a stretch of road on this route which was practically abandoned last spring; it was almost impossible for any one to drive along that road. The trustees finally came to the rescue. Tile was placed along the side of the road, and in just two days after that tile was placed there the rural carrier and other people were back on the highway, and the trouble ended.

My experience and what I am talking about, refers to southeastern Iowa, where the blanket of the glacial clay is deeper, and the streams have eaten deeper channels. With us the road problem is much more difficult than where there is a large amount of sand. In that section of the State are developed what we call spouty places. These places became so bad that something had to be done or traffic be suspended. I do not know of a single instance where tiling was tried without the most satisfactory results. It is well understood that a tiled field may be in excellent condition to work, while the same field untiled may be absolutely miry. I know of a field west of Hedrick, one third of which was tiled from the east end. A team could pass along the corn rows towards the west, but as soon as the west two thirds was reached, there was simply an oozing frog mire, over which a loose horse could only pass by a plunging effort.

Now, I am sorry to say that I am not able to give you the best detailed method of placing those tile; but, I think, any one who has had a little experience in tiling fields can not make any very serious mistake. In the first place, I would place along the road a single line on one side, and if time developed that more was needed, I would place another on the other side. Now, I do not care whether the water sinks to the tile from the surface or not; it is the water that is below you want to take care of; not the surface water. Your road boss should keep the surface smooth, sufficiently smooth from time to time, so that this surplus water would be shedded through the ditches. It is this surplus water on a cut up road that makes it bad. I do not say that tile will not take the water out better in some places than in others, but you get the tile well laid, with sufficient fall, and then if one will not do it, put in two, and if two will not do it, put in three, and then, my friends, you will not have the batch of figures given us from the stage tonight, as to the cost of the highways.

Mind you, I do not want to disparage the work these men have done, nor the figures they have given; they have more experience; I am talking as a novice. But it matters not whether you are to do macadamizing or what you are to do by way of further improvement, there is no question in my mind but what this under-drainage is the best part of the improvement. We can do this draining, and it will not only benefit the road, but it will benefit the fields.

Now, I will hasten away from this branch of the subject to spend a few moments on another, concerning which I feel a very deep interest at this time, because here in Iowa the question as to how we shall do it is even a more serious question than what you shall do. The Thirtieth General Assembly will meet now in a few days. There is a great deal of serious talk over the State, looking to the repeal of the new road law. Now, my friends, I want you to think what that means to us. If the new road law is inadequate, and you have something better to put in its place, by all means repeal it and put it in its place; but, in the name of all that is progressive, all that is desirable in the State of Iowa, do not repeal that law until you have something better to put in its place. Any law, if it is carefully considered by your legislature, is entitled to a fair trial.

Let us look at it a moment. In the first place, any law that touches the people directly, as a general road law does, can not be expected to work smoothly from the start. Again, our trustees and road bosses of Iowa were almost wholly inexperienced and without information generally as to its application, until they came right up to the time the work had to be begun. The job was a new one and had not time to attract efficient and good men for overseers or directors. Again, this has been one of the most difficult seasons in the history of the country to get good men in any and all lines of work. Again, we had just passed through a series of dry years and almost all of the small culverts had gone out, and because of the dry seasons there was no need to replace them. The excessive rains in the past season required this work to be renewed, almost in one job lot, it was an unusually bad season for roads in the State of Iowa, and for work upon them. Yet, under all these adverse circumstances, the law has not proven a failure, so far as I can ascertain. I know there were some townships in the State of Iowa where an adverse judgment was passed on that law in advance; in these townships the people tried to establish the fact that their judgment was right. Of course there was great dissatisfaction in these localities, but it was not with the new law, because the new law was not put in force. I know of no township, and I have taken some pains to investigate, where the trustees took hold of the execution of this law in good faith and really tried to get the best there was in it, and where they were fortunate enough to get a reasonable overseer, but what the law gave reasonable satisfaction.

So I say that I believe there will be an effort in the legislature to repeal it. I feel very anxious about the matter, because, to turn back now, to take up the old system that proved its inefficiency during forty or fifty years, and admittedly so by the people generally over the entire State of Iowa, to turn back to that now would certainly be an unwise thing.

I can not believe that the farmers of Iowa—sober, steady-going, well-meaning, intelligent farmers of Iowa—desire to repeal this law and turn back to the old one. Let us be sure we are getting something better before we repeal the present law.

I think we should take hold of this matter, and when we have once put the machinery in operation and get it to working smoothly with reference to the improvement of our roads, the question with reference to National and State aid can come wisely. There are many things in its favor; the fact that taxation would become general, and the fact that it is spread over a wider amount of property is in its favor.

I feel, from my standpoint, that we must wake up over the problem of good roads; we must get in harmony with the workings of it; we must get the machinery to working at home, and then, perhaps, these other things can come. This good roads edifice, I believe, should have its foundation at the bottom and build upwards.

GOVERNOR PACKARD: We might get some expression with reference to the repealing of this law. It is a matter of considerable interest, and I apprehend the objection to the present law is from those who prefer the old system. That is going to be a dangerous proposition. If we go back to the old system, we will be going to step backwards; if we stick to the present system, we are going to do something in advance.

A MEMBER: I have had some experience in the way of overhearing trustees, clerks and road bosses talk. Of course, this year, I think it was because they had to collect the tax and then work the road. But, after this year, the money is going to be collected by the treasurer; they know they can get the money and go ahead and do the work. As has been stated before, this has been the trouble. The law came into operation so late, and the men not acquainted with the law—they didn't get at it, and it being an exceedingly bad year, one man couldn't go over the township. That was the way with Madison county. We needed a good many bridges that were washed out. In some of our townships we had four or five men appointed. I believe we should stay by the new system; I believe it will work all right.

GOVERNOR PACKARD: Is there any objection to the system of paying cash?

A MEMBER: There is some objection; but I think that will soon pass away. After this, they will pay it all in a lump and will not know how much of it is for road purposes.

A MEMBER: I wish to say one thing in regard to this matter. For four years now, in Page county, we have been letting the road work out. There was a great deal of objection at first, and at last the trustees put it to a vote a year ago and the opposition was voted down by a vote of three hundred and thirty-three to fourteen. Where it is tried and given a fair trial I think it will give far better results and the people are becoming better satisfied.

MR. TRIGG: In order to put the matter suggested by Governor Packard in shape, I offer this motion: "That it is the sense of this convention that the present road law be not repealed until it has been given a full and fair trial; that is, not changed at all, unless it be simply amended.

The motion was duly seconded.

MR. KLEINFELTER: I would like to ask one question. Does the new law place the burden of taxation for public highways upon the farmers adjacent to the roads, that is, the burden of building the roads upon the local people, or does it distribute it among other people who use the roads, and who really use the roads more than the farmer does? In other words, does the new law leave the burden upon the farmer along whose land the road is built, or does it distribute the expense of it among all the people in different lines of business?

THE PRESIDENT: As I understand the matter, everybody pays.

SENATOR BROOKS: This question, covered by the motion of Mr. Trigg, is whether you prefer the present system to the old one, that is, whether this law shall be tried or repealed; whether we prefer the present law or the old system.

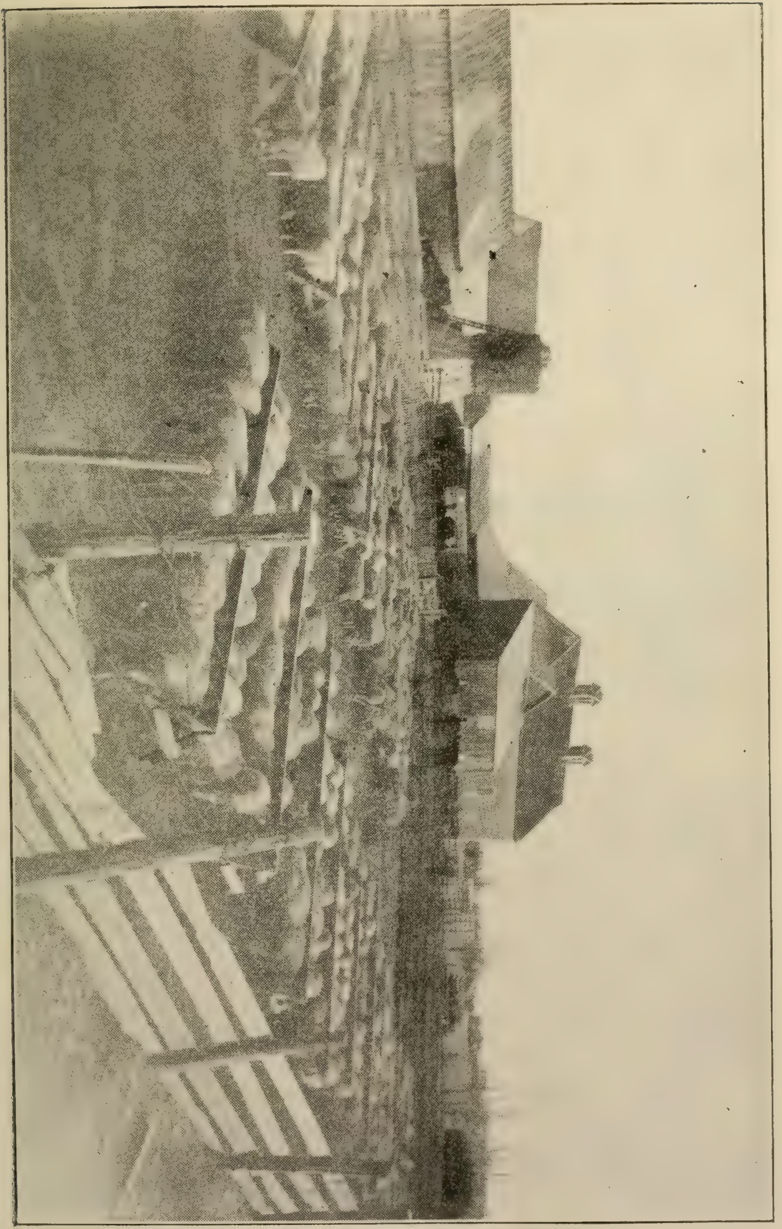
The motion as made by Mr. Trigg was put before the convention and carried, there being one dissenting vote cast against it.

MR. TRIGG: I have another resolution I would like to offer. You have noticed probably, since we came to Des Moines, the difficulty connected with the various meetings of the different associations, the Horticultural Society, the Farmers Institute, and the Park and Forestry Association. Many of us who have come from one hundred to two hundred miles, have been debarred from attending these different meetings, because of their being held at one and the same time. The Forestry Association has passed the resolution I hold in my hand, and the Horticultural Society will adopt it tomorrow morning, and I was requested to present it to the Agricultural Society tonight. It reads as follows:

> Whereas, A large number of Iowa citizens from all parts of the State assemble at Des Moines in December of each year to attend the agricultural, horticultural and forestry meetings, and,
>
> Whereas, As these visitors have a common interest in all of these three branches of work, and the meetings so held are separate and held at the same time, thereby dividing the attendance and preventing these visitors from enjoying the benefits of these gatherings; therefore be it
>
> Resolved, That the officials of the three different named organizations be requested next year to arrange for a three or four days' consolidated program, the meetings to be held at some suitable central hall, the sessions of such meetings to be divided and apportioned to the three societies, to the end that a large attendance may be thus secured and that all may thus enjoy the benefits of these meetings.

The motion was duly seconded and adopted.

The convention adjourned.



Western lambs in feed lot of C. E. Cameron, Buena Vista county.

SYNOPSIS OF BOARD AND COMMITTEE MEETINGS

FROM JANUAY, 1903, TO DECEMBER, 1903.

MEETING OF THE STATE BOARD OF AGRICULTURE.

TUESDAY, MARCH 3, 1903.

Board met at 9 o'clock A.M. in the office of the secretary, and on roll call the following members were found to be present: Morrow, Cameron, Simpson, Manatrey, Phillips, Brown, St. John, Packard, Legoe, Wragg, Ledgerwood, McDonald, Wadsworth and Pike.

The president stated that the object of the meeting was for the purpose of considering the improvements and repairs on the fair grounds during the year 1903.

Mr. Packard moved that the board take a recess and visit the fair grounds. Motion prevailed.

AFTERNOON SESSION.

Board met pursuant to adjournment, with all members present.

Hon. John Cownie appeared before the board and on behalf of the State Board of Control extended an invitation to the State Board of Agriculture to attend a cantata at Mitchellville, given by the girls of the Industrial School.

The secretary presented the form of contract as agreed upon between the Department of Agriculture and the Des Moines City Railway Company, granting a twenty-five (25) year franchise for extending the said company's street car line into the fair grounds.

Mr. McDonald moved that the executive committee be authorized to make a contract with the Des Moines City Railway Company for extending of their lines into the fair grounds. On roll call the motion carried by a unanimous vote.

Appropriations were made for expenses and repairs to the amount of $18,500.

Mr. Ledgerwood moved that the executive committee be authorized to have horse barns Nos. 7, 11 and 12 moved. Motion prevailed.

The secretary read communication from the president of the National Live Stock Exhibitors' Union, and on motion the same was referred to committee on resolutions.

Mr. Ledgerwood moved that the executive committee be authorized to have repaired or torn down any buildings on the State fair grounds belonging to private parties, on which such repairs are needed or in their judgment are unsafe. Motion prevailed.

The secretary presented letter and claim of Mr. Truesdale in regard to the loss of a lace handkerchief at the fair of 1902, and on motion of Mr. Wadsworth said claim was laid on the table.

Communication from the secretary of the Corn Growers' Association asking that the department make an appropriation for a special premium for the corn exhibit which they will hold next winter at Ames was read by the secretary, and on motion of Mr. Packard the secretary was instructed to notify the Corn Growers' Association that in the opinion of the board it would be inexpedient to make appropriations of this character outside of our own premium list.

Mr. Wragg moved that the superintendent of privileges and the executive committee be made a committee to examine the books of the privilege department and report as to whether it would be possible to increase the amount of money received from privileges. Motion prevailed.

On motion of Mr. McDonald the board adjourned to meet at 9 o'clock Wednesday morning.

WEDNESDAY MORNING, MARCH 4, 1803.

Board met at 9 o'clock pursuant to adjournment, and on roll call all elected members were found to be present.

Minutes of yesterday's meeting were read and approved.

Mr. Packard, chairman of the committee on resolutions, presented the following report, and on motion of Mr. Wragg the same was adopted.

RESOLUTION.

Your committee on resolutions to whom was referred the communication from the President of the National Live Stock Exhibitors' Union, beg leave to report the following preamble and resolution:

Whereas, The custom has existed for the free return of live stock exhibited at expositions and State fairs upon the direct return to the point of shipment of such exhibitors, and,

Whereas, Exhibitors to the State fairs are necessitated to pass from one fair to another on the circuit to exhibit their stock and not directly returning to the shipping point, thus under the rules of the railways secrificing their half-rate claims; therefore be it

Resolved, That the State Board of Agriculture respectfully solicit from the railways an exercise of their liberal rates on one half full fare to exhibitors' following the circuit of the State fairs, which will greatly encourage the exhibition of the products of the farms of the country and thus add to the prosperity of the railways as well as the several states interested.

Resolved, That the society forward a copy to the proper railway association for the government of freight rates.

S. B. Packard,
R. T. St. John,
M. McDonald,
Committee.

RESOLUTION.

Whereas, Under the law creating the State Board of Agriculture one of the duties imposed in section six is in the following words: "And it shall be the duty of the board to look after and promote the interests of agricultural education and animal and other industries throughout the State," and

Whereas, The high condition which the college has attained warrants our support in maintaining its high standard; therefore be it

Resolved, That the President of this board appoint a committee of three members authorized to confer with the Board of Trustees of the College of Agriculture and Mechanic Arts on the subject of a president for said college.

S. B. Packard,
R. T. St. John,
M. McDonald,
Committee.

The president appointed as such committee, S. B. Packard, C. W. Phillips and John Ledgerwood.

Mr. Manatrey moved that the committee on adulterations of foods be empowered to prepare a report on this subject and submit to the board at their meeting next December, and that a sum not exceeding one hundred fifty dollars ($150) be appropriated to meet the expense of carrying on this work. Motion seconded by Cameron and prevailed.

Mr. Erickson, in charge of the dairy department of the Iowa Louisiana Commission, appeared before the board and asked their co-operation in securing the exhibit for the Louisiana Exposition.

Mr. Hamilton of the Daily News, Mr. Young, Jr., of the Daily Capital, Mr. Strauss of the Register-Leader and Mr. Wallace of Wallaces' Farmer, appeared before the board and asked that an appropriation of from two to three thousand dollars be made for the purpose of display advertising in the above-mentioned papers; including also the Homestead and Farmers' Tribune.

On motion board adjourned to 1:30 P.M.

AFTERNOON SESSION.

Board met pursuant to adjournment with members present as at morning session.

Mr. McDonald moved that the executive committee be authorized to secure night and day attractions for the fair of 1903. Motion prevailed.

Mr. Manatrey moved that the price of admission to the amphitheater and all other seats used at night attractions be sold at twenty-five cents. Motion prevailed.

Mr. Manatrey moved that the executive committee be authorized to purchase a show case of Morrison, Plummer & Co., of Chicago, for use in Exposition Building at a sum not exceeding $250 f. o. b. cars Des Moines. Motion prevailed.

Mr. Wadsworth moved that the advertising of the State fair be left in the hands of the executive committee, which motion prevailed.

Mr. Manatrey moved that the president appoint a committee on per diem and mileage. Motion prevailed.

President appointed as such committee Wadsworth, Manatrey and Brown.

Mr. Manatrey moved that when this board adjourns all unfinished business be delegated to the executive committee to act, which motion prevailed.

Committee on per diem and mileage reported as follows, and on motion of Mr. Cameron report was adopted:

Name.	Days.	Amount.	Miles.	Amount.	Total
W. W. Morrow	4	$16.00	82	$ 8.20	$ 24.20
C. E. Cameron	4	16.00	140	14.00	30.00
J. P. Manatrey	5	20.00	118	11.80	31.80
C. W. Phillips	3	12.00	...	......	12.00
W. C. Brown	4	16.00	102	10.20	26.20
R. T. St. John	4	16.00	195	19.50	35.50
S. B. Packard	4	16.00	58	5.80	21.80
T. C. Legoe	4	16.00	100	10.00	26.00
M. J. Wragg	4	16.00	16	1.60	17.60
John Ledgerwood	4	16.00	87	8.70	24.70
M. McDonald	4	16.00	65	6.50	22.50
J. W. Wadsworth	3	12.00	123	12.30	24.30
H. L. Pike	4	16.00	200	20.00	36.00
					$332.60

J. W. Wadsworth,
J. P. Manatrey,
W. C. Brown,
Committee.

On motion board adjourned.

J. C. Simpson, Secretary.

MEETINGS OF THE STATE BOARD OF AGRICULTURE.

STATE FAIR GROUNDS, THURSDAY MORNING, AUGUST 27, 1903.

Meeting called to order by the president, and on roll call the following members were found to be present: Morrow, Cameron, Simpson, Ellyson, Phillips, St. John, Packard, Legoe, Wragg, Ledgerwood, McDonald and Manatrey.

Mr. Cameron moved that the chief of police, superintendent of gates and the treasurer be permitted to relieve any of their men who desired to go home, and that the secretary be instructed to issue warrants in payment of their services.

Mr. Legoe moved that the secretary be authorized to issue warrants in payment of stock premiums, as soon as books are received from the respective stock departments. Motion prevailed

Mr. Ellyson moved that the secretary be authorized to issue warrants in payment of judges when the same had been o. k.'d by the superintendent of the department. Motion prevailed.

On motion board adjourned to meet at 12 o'clock noon, August 28th.

FRIDAY, AUGUST 28, 1903.

Board met pursuant to adjournment, and on roll call the following members were found to be present: Morrow, Cameron, Simpson, Manatrey, Phillips, St. John, Packard, Legoe, Wragg, Ledgerwood, McDonald and Pike.

AUGUST 29, 1903, 10 O'CLOCK A. M.

Board met pursuant to adjournment with the following members present: Morrow, Simpson, Brown, St. John, Packard, Legoe, Wragg, Wadsworth and Pike.

Mr. Packard presented a petition from the manufacturers of Marshalltown, asking for a location of a building on the fair grounds. Action was deferred until the December meeting of the board.

Mr. McDonald moved that the executive committee be authorized to purchase a manure spreader. Motion prevailed.

Mr. Legoe moved that the executive committee be authorized to procure cinders for use on the fair grounds. Motion prevailed.

Mr. Packard moved that the executive committee be authorized to have grounds surveyed for drainage, and that the work be done this fall if possible.

The secretary presented resignation of Mr. C. S. Relyea as assistant secretary, to take effect September 1, 1903, and on motion of Mr. Manatrey the resignation was accepted.

Mr. Packard moved that the vacancy caused by the resignation of Mr. Relyea be filled by an appointment by the secretary at a salary not exceeding $75 per month. Motion prevailed.

Mr. Wragg presented report on per diem and mileage as follows:

Name.	Days.	Rate.	Amount.	Miles.	Amount.	Total
W. W. Morrow	19	$4.00	$ 76.00	82	$ 8.20	$ 84.20
C. E. Cameron	19	4.00	76.00	140	14.00	90.00
J. P. Manatrey	18	4.00	72.00	118	11.80	83.80
W. C. Brown	19	4.00	76.00	102	10.20	86.20
S. B. Packard	17	4.00	68.00	54	5.40	73.40
H. L. Pike	19	4.00	76.00	200	20.00	96.00
John Ledgerwood	19	4.00	76.00	89	8.90	84.90
R. T. St. John	20	4.00	80.00	195	19.50	99.50
M. McDonald	18	4.00	72.00	65	6.50	78.50
M. J. Wragg	18	4.00	72.00	16	1.60	73.60
J. W. Wadsworth	31	4.00	124.00	123	12.30	136.30
T. C. Legoe	17	4.00	68.00	100	10.00	78.00
C. W. Phillips	19	4.00	....	...	......	76.00
						$1,143.40

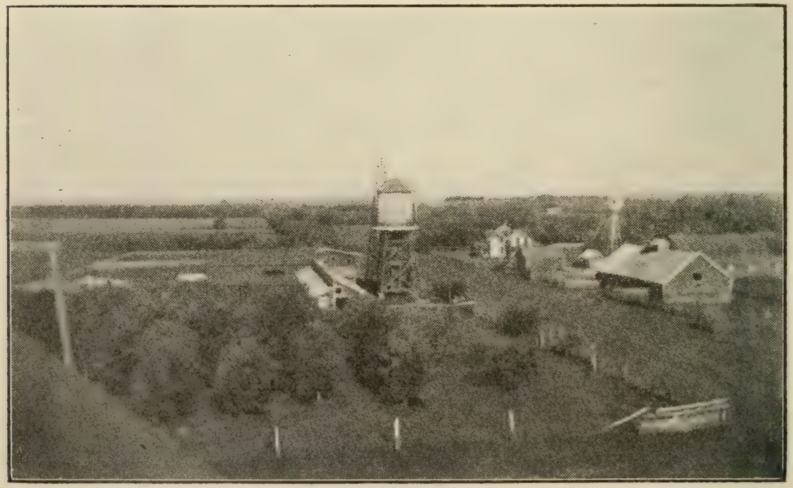
AUDITING COMMITTEE MEETING.

TUESDAY, SEPTEMBER 15, 1903.

Auditing committee met as per agreement, with the following members present: J. W. Wadsworth, W. C. Brown and C. W. Phillips.

The chairman stated that the purpose of the meeting was to pass on all bills against the Department of Agriculture, which were on file in the secretary's office.

The bills were audited and the secretary authorized to issue warrants in payment thereof, as per amounts allowed.



Farm Scene—Home of Hon. F. M. Buckingham, Buena Vista County.

EXECUTIVE COMMITTEE MEETING.

THURSDAY, OCTOBER 14, 1903.

Committee met on call of the president, with all members present.

Mr. Morrow stated that the purpose of the meeting was to consider the matter of surveying the grounds for drainage, as per resoluion of the board at their August meeting.

Mr. Baker, assistant city engineer of Des Moines, met with the committee, and together visited the fair grounds. All that part of the ground in need of drainage was gone over with Mr. Baker. Committee decided to employ Mr. Baker to run such levels as were necessary for drainage, and a combined curb and gutter along the north side of Grand Avenue. Mr. Baker's salary was to be $4 per day, and $3 per day for an assistant, if same was used.

The committee decided to offer the following resolution for the consideration of the board:

1st. That the secretary be instructed to make a plat of the ground, laying it out in different sections, as per lines designated by streets and sidewalks, taking the measurement thereof, and that certain sections be reserved for the erection of future permanent buildings.

2d. We would recommend that the Department of Agriculture go before the next legislature and ask for an appropriation sufficient to build a fireproof building for the use of the agriculture, horticulture and dairy departments, and the remodeling of the old horticultural building for use as a woman's building; and an additional appropriation sufficiently large for the purpose of erecting three hog barns.

3d. We would recommend that all buildings erected for the purpose of showing collective exhibits, by cities, towns or other parties, or corporations, be located immediately west of the ditch and south of Capitol avenue,, provided, that the board makes provision for a walk from Capitol avenue running east to Rock Island avenue, and otherwise improve the street by curbing and guttering, and properly drain that part of the ground.

STATE AGRICULTURAL CONVENTION AT DES MOINES.

WEDNESDAY, DECEMBER 19, 1903.

The convention convened in the rooms of the Department of Agriculture in the Capitol, at 10 o'clock, with President Morrow in the chair.

The first order of business being the appointment of a committee on credentials, the president appointed the following delegates as members of that committee: J. W. Wadsworth, Kossuth county; Chas. Hearst of Black Hawk county and Chas. Stranahan of Ringgold county.

Vice President Cameron was called to the chair, and President Morrow delivered the following address:

PRESIDENT'S ADDRESS.

We are here today to make our annual report, and to elect officers for the coming year.

The expenditures on the State fair grounds for the year of 1903 were, in round numbers, $17,000, consisting of team, harness, wagon, scales, greenhouse brick walks new swine pens and a new street car station, a detailed statement of which will be found in the secretary's report.

The board very wisely entered into a contract with the street car company whereby they entered the grounds, and during the fair furnished first-class service; this, with the splendid service furnished by the Rock Island Railway Company, gives the patrons of the fair such method of going to and returning from the grounds as they have long desired.

The fair of 1903, in point of exhibits, was one of the best in the history of the State. Had the weather been favorable the net earnings would have been far greater than that of any fair ever held by this department. As it was, the receipts were such as to leave a handsome surplus in the treasury, a detailed statement of which will be found in the secretary's report, showing that the people are interested in the success of the fair, and it becomes our duties as officers of this association to redouble our efforts to maintain the high standard and reputation that the State Department of Agriculture now enjoys.

The improvements already commenced, consisting of permanent buildings, sidewalks and other improvements, should be carried on. More brick walks should be constructed, also cinder walks should be laid to and from the different buildings, thereby enabling visitors to reach all parts of the ground with comfort.

The executive committee have had the grounds surveyed with a view of thorough drainage. The different plats of ground have been measured, a plat of which is now on file in this office. We recommend that certain plats of ground be set aside for permanent buildings to be erected in the future by this society. Also, that plats of ground be set aside for buildings to be used by the different cities of the State, to exhibit their manufactured products. Great care should be taken that all buildings should be properly located.

I also wish to suggest that a fireproof building should be erected for the use of the power house and pumping station, as the present building is not in the proper place for our lighting plant.

The hay barn should be moved in close proximity to the cattle and horse barns. The three barns numbered 10, 11 and 12 should be moved to some other location, and the ground now occupied by them made attractive.

The tract of land lying outside and east of the fair grounds proper, consisting of three acres now covered with timber and undergrowth, should be cleared, and the land rented for pasture, or what might be better, the level part of it cultivated and sown to meadow, the hay to be sold during the fair.

I would recommend that the fences, as fast as they need rebuilding, be replaced with woven wire, something similar to that now used by the street car company.

If any excuse ever existed for side shows and fakirs in general, it seems to me that the time is past, and I want to recommend that all such be excluded from the grounds, and that the Great Iowa State Fair be conducted on such a high plane as will meet with the approval of the intelligent people of the State.

Secretary Simpson read his report as follows:

REPORT OF SECRETARY FOR THE YEAR 1903.

J. C. Simpson, Des Moines, Iowa.

Iowa's State fair continues to grow. The exhibition of 1903 was the greatest in the history of the State. Probably no State fair was ever held under more adverse weather conditions, and the financial showing we are now able to make is all the more remarkable for it. What the outcome would have been under favorable conditions, can only be conjectured. That the receipts would have been from ten to fifteen thousand more I believe to be a conservative estimate. Thousands of people who were in the city did not reach the fair grounds, and from information we have received, thousands of others who had planned on coming, did not leave home after it began raining. Certainly the prospects for a successful State fair were never as poor as on Monday evening after the heavy wind and rain storm. With a cloudy morning on Tuesday, followed by two days more of rain, the outlook was enough to discourage the most optimistic. But despite this unfavorable conditin of the weather, crowds of people thronged the grounds on Tuesday and Wednesday, it having been years since as many soldiers attended the fair, and the record of Wednesday has only been surpassed a few times.

The race program was interfered with more than any other department. It being carried out to the letter on Monday, but on Tuesday, while it was not actually raining, the day was cold and cloudy, and the condition of the track was such that it was after four o'clock before a heat could be started. Only three heats could be put on before it was time to clear the grand stand for the night entertainment. Wednesday and Thursday no harness events could be had, and it was not until Friday afternoon that the races could again be started. This interfered very materially with the grand stand receipts.

This year's fair certainly demonstrates that a successful fair can be held under the most favorable weather conditions, with the proper buildings, plenty of sidewalks and drainage. Where would the fair have been this year without the stock pavilion and sidewalks? It would have been an utter impossibility to have continued throughout Wednesday and Thursday. The wisdom shown by the members of the Twenty-ninth General Assembly in making the appropriation for the erection of the stock pavilion, was certainly appreciated this year. For this expenditure no complaints were heard from the taxpayers of Iowa who attended the fair, and many expressed themselves in favor of the legislature making further appropriations, that other permanent buildings might be placed upon the grounds.

I have always contended that the educational advantages resulting from a properly conducted State fair could not be measured in dollars and cents, and that the results obtained were far more beneficial than most of us are prone to believe. Many an inspiration for improvement in flocks and herds is received at these annual expositions which can not be gathered at any other place. The American farmer, like the manufacturer, is never satisfied unless he is pushing forward and trying to do better than his neighbor. Where can he better compare the products of his own farm than with what is shown at our State fair?

The stockman who does not keep pace with the improvements continually being made in the different breeds of live stock, is no better off than the merchant who does not keep posted on the latest and most improved methods of conducting his business; or the grain farmer who does not take advantage of every opportunity to improve his seed and cultivate his crops that he may receive a better and larger yield of grain per acre. He indeed is a wise man who can not gather new ideas from his neighbor.

As the value of farm land increases, so must the farmers' knowledge of how to produce greater results per acre increase. A farmer, like a professional or business man, must be a close student of the work he is following. A study of the Government census report for 1900 shows that the increase of population of the United States for the preceding ten years was over fourteen millions, or about twenty per cent of our total population. Iowa's population is shown by the same census to be a fraction over two million two hundred thousand, or about one sixth of the total increase for the whole United States for the ten years just mentioned. The amount of food consumed yearly by this great increase of population is enormous, and with a yearly decrease in the acreage of new agricultural land, but one choice is left, we must produce more bushels per acre on land now cultivated, and raise cattle and hogs that will take on more meat per pound of grain and forage consumed. To accomplish this the farmer must keep in close touch with experiments continually being conducted, and by a careful observation of the results of his own work. Many improvements for the decrease in the cost of production, or increase in yield per acre, are noted by the exhibits shown at the annual State fair from year to year If the same relative percentage of increase in the population of the United States is returned fom the census of 1910 as that of 1900, it will give us an increase of over twenty millions, or nine times the total population of the State of Iowa. Iowa farmers must do their part toward furnishing food for this great army of people. Anything that tends to increase their knowledge along these lines is of great importance, and that is the purpose of the Iowa State fair.

The future never looked brighter for the fair than at the present time, but we must not cease in our efforts if continued progress is to be made. While the condition of the grounds is now better than ever before, this can not be truthfully said of the buildings thereon. Many of them have been repaired and patched so often that there is now little left other than the repairs. The time is soon coming, if indeed it is not already here, when many of the buildings will have to be replaced if a fair is to be held. The only way in which permanent fireproof buildings can be erected is by appropriations from the legislature. It is absurd to think that sufficient money can be secured from gate admissions for this purpose, when the burden of keeping the old buildings now on the grounds in a safe and habitable condition is increasing yearly. Does the State expect its other educational institutions to erect and maintain their buildings? And are not the educational features of the State fair worthy of support of our great State? The question is often asked, why the management does not erect permanent buildings out of the funds on hand. This can better be answered by a statement of the improvements and repairs that are needed at this time.

At the last session of the legislature the State Board of Agriculture asked and received an appropriation of thirty-seven thousand dollars, for the erection of the live stock judging pavilion. A total of forty-four thousand three hundred twelve dollars and fifty-one cents has been expended during the past two years for permanent impovements and repairs out of the gate receipts, which is seven tnousand three hundred twelve dollars and fifty-one cents more than the appropriation received from the State during the same period. A very serious problem now confronts the Board, in knowing just how to proceed with the improvements and repairs necessary for the future. Of the fifty-one stock barns, at least fifty of them are in need of new roofing; part of the fence surrounding the grounds will have to be replaced; a more prominent entrance should be erected at the Grand Avenue gate, and more sidewalks should be laid. The west part of the grounds must be drained; combined curbs and gutters should be put in along the streets to properly care for the surface water; many of the buildings are badly in need of paint; and other improvements and repairs too numerous to mention should be given attention. Thousands of dollars will be needed for all these improvements; much more, in fact, than the Board will have at its disposal, therefore some of them will have to go over.

An appropriation from the Thirtieth General Assembly should be asked for the erection of a combined agricultural, horticultural and dairy building; also for at least three hog barns. Should the State Board of Agriculture decide to go before the legisalture and ask for these appropriations, they should have the combined efforts of all the agricultural interests of the State. If an appropriation for the erection of the first building mentioned is secured, it will give much needed room in other departments. What is now agricultural hall could be easily arranged into a large poultry building. The one used at present is not half large enough for the exhibit, besides there being no room for the exhibit of incubators, which should properly be shown in the poultry building. The poultry and dairy buildings could be remodeled into sheep barns, for if something is not done to better the condition of this department, it will not be long until the sheep show at the Iowa State Fair will be a thing of the past. Horticultural hall could be rearranged for the women's building. The urgent necessity of a building of this character was never more apparent than at the last fair. All great expositions, and even the railway companies, have buildings or rooms fitted with every comfort and convenience for women. Every mother knows the hardships to be endured traveling with small children. If it were to become generally known that a building of this kind was located upon the grounds, where the mother could go with her children for a little rest, after a tiresome ride on a crowded excursion train, it would greatly popularize our fair. In our endeavor to better arrange for the comfort of fair visitors, the ladies should not be forgotten.

Many improvements were made on the grounds during the past season. More than one hundred thousand paving brick were laid in walks; a greenhouse and swine judging pavilion were erected; the seating capacity of the grand stand was increased by an additional twenty-five hundred seats; a street car station was erected, one half of the cost being paid by the Board; and four hundred more hog pens were built. All the space in the Iowa building could not be rented while the building stood in the old location, and it was moved to the present site, thereby increasing the floor space in the machinery department about six thousand square feet. The erection of the street car station necessitated the moving of three horse barns; new sills and foundations were placed under six cattle barns. Two additional wells were put down, one in the speed, and the other in the machinery department; many hundred loads of cinders were hauled on the streets, and new ones were graded. The inside fence of the race track was rebuilt, and a new judges' stand replaced the one blown down; needed changes were made in the water mains and electric light lines, including the purchase of twelve additional arc lamps. A glance a the financial statement will show that all these changes and improvements necessitated the expenditure of a large sum of money. If new buildings are not erected in the near future, it will just about take the entire surplus each year to keep up the repairs, leaving nothing with which to make needed improvements. Insurance to the amount of seventy-eight thousand dollars is now being carried on the fair ground buildings.

The exhibit of horses at the last State fair was the best in years, this being especially true of the draft and coach breeds. While the number of entries in the cattle classes was no larger than a year ago, the herd showing was stronger. Twenty-five hundred and seventy hogs were on exhibition, this being the greatest number ever shown at any fair, and exceeds the combined number shown at the Minnesota, Wisconsin, Illinois, International and American Royal shows. No one visiting the fair had any reason to doubt Iowa's greatness as a pork producing State.

It was utterly impossible to provide coop room for all the poultry brought to the fair. If people could comprehend the magnitude of the poultry industry in our State they would more readily understand the reason for so large an exhibit. To give you some idea of what poultry is doing fo the farmers of Iowa I will state that in the year 1899 the value of poultry raised and eggs produced amounted to over nineteen million four hundred thousand dollars, or only about three millions less than the total value of the oat crop for 1902.

At no State fair was there ever a larger and more diversified showing of farm implements, buggies, carriages, fences, etc., than was on exhibition this year. It would be difficult to conceive of any agricultural implement now used on the farm that was not shown. Never has there been a year when it was more difficult to gather an exhibit of agricultural and horticultural products than the past, and, all things considered, the showing made in the agricultural and horticultural halls was very good. An unusually large and tastefully arranged exhibit was to be seen in the exposition building.

A new and popular feature added to the program this year was the Iowa State College Scholarship, awarded to the boy scoring the highest in the judging contest. Out of the twenty-eight boys who had entered, twenty-six of them were on hand ready for business at the designated time. Mr. Ellis Rail of Birmingham, Iowa, received the highest score and was awarded the scholarship. The rules and regulations governing this contest, together with the score of each contestant, will be published in the Year Book. I believe this contest should be made an annual feature of future State fairs.

Seventy-two county and district agricultural societies reported holding a fair this year, and received the State appropriation according to law. From the reports received, this State was not the only fair to suffer the effects of wet weather. Fully 75 per cent of those reporting stated that the rain interfered with their fair. The reports received show that the interest in county and district fairs is increasing instead of decreasing, as many are prone to believe.

INSTITUTES.

Sixty-six counties in Iowa held institutes during the year ending June 30, 1903, and fifty-eight the preceding year. The total amount paid out by the State for institute work during the biennial period was $6,801.85.

Below will be found the name of counties receiving State aid for institute work during the year ending June 30, 1903, and amount each received:

Counties.	Amount.	Counties.	Amount.
Adams	$ 42.57	Iowa	$ 75.00
Audubon	43.10	Jackson	63.14
Black Hawk	75.00	Jasper	31.30
Boone	73.24	Jefferson	49.00
Bremer	75.00	Kossuth	49.65
Buchanan	58.50	Linn	75.00
Buena Vista	75.00	Louisa	60.52
Butler	75.00	Lyon	75.00
Calhoun	47.05	Madison	75.00
Carroll	43.00	Mahaska	75.00
Cedar	34.50	Marion	50.00
Cerro Gordo	54.40	Mills	19.30
Cherokee	75.00	Mitchell	75.00
Chickasaw	69.75	Monona	75.00
Clay	75.00	Muscatine	59.15
Clayton	46.70	O'Brien	75.00
Clinton	75.00	Page	75.00
Dallas	75.00	Palo Alto	75.00
Decatur	60.00	Polk	62.80
Delaware	35.74	Ringgold	30.50
Dickinson	61.33	Sac	75.00
Emmet	51.00	Scott	64.55
Fayette	75.00	Shelby	75.00
Floyd	73.50	Sioux	75.00
Franklin	74.75	Story	46.35
Fremont	73.94	Tama	33.25
Greene	74.00	Taylor	64.94
Grundy	58.51	Van Buren	51.15
Guthrie	50.50	Winnebago	75.00
Hancock	15.75	Winneshiek	75.00
Hardin	33.85	Worth	52.54
Harrison	75.00	Woodbury	50.00
Humboldt	75.00		
Ida	71.50	Total	$4,035.33

In the following counties no institutes were held during the year ending June 30, 1903:

Osceola,
Plymouth,
Webster,
Crawford,
Jones,
Pottawattamie,
Warren,
Montgomery,
Lucas,
Henry,
Appanoose,
Howard,
Pocahontas,
Hamilton,
Marshall,
Poweshiek,
Cass,
Keokuk,
Union,
Monroe,
Des Moines,
Davis,
Allamakee,
Wright,
Dubuque,
Benton,
Johnson,
Adair,
Washington,
Clark,
Wapello,
Wayne,
Lee.

From the expense accounts filed with the State Auditor, it would seem that more attention is now being given for exhibits of corn and other farm products at the county institutes.

It has been hard to secure statistics and papers from the institutes in the past, for the reason their officers are not obliged by statute to send in reports, other than the expense account filed with the State Auditor. It has been suggested by many that the law should be amended, requiring a report to be filed with the Department of Agriculture, in order that such papers and statistics deemed of importance to the State could be published. As it is, many valuable papers read before our county institutes are lost to every one except those living in the vicinity of the city or town in which such institute is held. I can heartily endorse such an amendment, believing, as I do, that it would work to the mutual advantage of the institutes and department.

The local management of the institutes would not be altered in the least.

This, to say the least, is worthy of consideration, and should the change be asked I believe it would have the support of every institute worker in the State.

Attached to, and made a part of, this report is a complete statement showing the financial condition of the department December 1, 1903, which is the close of the fiscal year.

Gentlemen: Herein find moneys coming into my hands as secretary and paid to G. D. Ellyson, treasurer, as shown by his receipts:

From exhibitors tickets	$1,550.00
From sale of fed, forage department	1,730.65
From advertising in premium list	180.00
From refund on error in payment of premiums	203.00
From refund on insurance and loss	212.34
From speed suspensions	140.35
From judging contest, entry fees	54.00
From speed entries	2,892.65
From Des Moines City Railway Co	228.60
From refund on purchases	23.00

From rent of fair grounds	$ 50.00	
From State appropriation for insurance and improvements	1,000.00	
From Chicago & North-Western Railway Co.	120.00	
From Shorthorn Breeders' Association	477.00	
From interest on deposit	1,009.90	
Total		$9,871.49

Secretary's Account of Expense Warrants During Fiscal Year Ending December 1, 1903.

Bills paid for the year 1902		$ 220.14
Board meeting December, 1902		412.10
Fair Ground expenses		687.27
Improvements and repairs:		
Street car station	$ 3,033.67	
Sidewalks and crossings	1,403.34	
Moving and repairing Iowa building	793.36	
Rebuilding and repainting race track fence	487.68	
Pair scales	125.00	
Team, harness and wagon	510.02	
Planting trees	280.64	
Hauling gravel, cinders and work on streets	269.71	
Swine judging pavilion	1,789.64	
Raising and repairing cattle barns	623.20	
Repairs on sheep pens	156.24	
Repairs on horse barns	214.29	
Repairs on poultry house	28.66	
Repairs on agricultural hall	41.87	
Improvements on exposition building	339.95	
Repairs on dairy hall	175.08	
Washing places for cattle	20.67	
Greenhouse	1,580.97	
Swine pens	1,780.27	
Bleechers	568.88	
Awnings on stock pavilion	188.40	
Painting	199.23	
Electric light and power station	657.54	
Insurance	203.13	
Secretary and treasurer's office	78.11	
Amphitheater	55.15	
New wells and pumps	101.41	
March board meeting called expressly for considering improvements	332.60	
Miscellaneous improvements	1,817.36	$17,855.77
Executive committee meetings		397.60
Executive committee annual meeting		34.18
Postage		460.00

Printing	$ 791.70
Advertising	2,609.49
Express and telegraph	156.12
Superintendent fair grounds—salary	800.00
Dues, American fairs and expositions	15.00
Premium list	494.50
Engraving and medals	11.50
Miscellaneous expenses	1,226.20
Pure food committee	69.46
Special committee work	131.75
Collection paid to trotting association	61.15
Dues to American Trotting Association	75.00
Insurance	203.13
Telephone	19.25
Office supplies	1.35
Clerical work	363.60
Cattle department	342.46
Music	868.20
Attractions	4,226.50
Scavenger work	153.75
Auditing committee	58.50
Scholarship contest	219.00
Assistant superintendent fair grounds	64.55
Police department	1,574.75
Forage department	1,853.52
Horse department	328.85
Speed department	327.25
Swine department	258.40
Sheep and poultry department	274.45
Machinery department	221.27
Agricultural department	413.75
Dairy department	131.75
Horticultural department	234.34
Art department	591.70
Gate department	726.50
Ticket department	200.56
Treasurer's department	610.55
Marshal's department	120.00
Privilege department	179.50
Electric light department	407.60
President's department	84.20
Total	$41,550.16

SECRETARY'S ACCOUNT WITH G. D. ELLYSON, TREASURER.

Receipts.		Credit.	Debit.
To cash on hand December 1, 1902		$30,372.25	
From W. C. Brown, Supt. horse department		617.00	
S. B. Packard, Supt. cattle department		678.50	
W. M. McFadden, Supt. swine department		590.50	
H. L. Pike, Supt. sheep and poultry department		212.90	
J. Ledgerwood, Supt. machinery department		1,092.50	
R. T. St. John, Supt. agricultural department		245.00	
M. McDonald, Supt. dairy department		120.35	
M. J. Wragg, Supt. horticultural department		30.00	
J. P. Manatrey, Supt. fine arts		1,255.75	
T. C. Legoe, Supt. gates		510.36	
Donald Hill, chief of police		4.50	
John Cownie, refund on railroad fare		31.95	
John Cownie, Supt. electric light plant		106.75	
W. W. Morrow		.90	
J. W. Wadsworth, Supt. privileges		5,660.00	
Jas. H. Deemer, Supt. fair grounds		1,617.55	
J. C. Simpson, secretary		9,871.49	
Ticket sales		41,333.35	
Disbursements.			
By expense warrants paid—			
1902	$ 29.55		
1903	41,547.91		$41,577.46
By premium warrants paid—			
1902	$ 54.90		
1903	23,756.13		23,811.03
By cash on hand December 1, 1903			28,963.11
		$94,351.60	$94,351.60

Cash on hand December 1, 1903	$28,963.11
By outstanding warrants December 1, 1903	68.50
Total credit for department agriculture	$28,894.61

STATEMENT OF RECEIPTS FOR 1903,

as compared with the preceding year, showing increase or decrease as the case may be.

I herewith give a comparative statement of the receipts for the years of 1902 and 1903, with the exception of the $37,000 appropriation received from the State in 1902 for the erection of the stock pavilion.

This statement shows an increase of $2,182.78 in gate, quarter stretch, and receipts from other sources; but a decrease of $5,324.90 in day amphitheater, night amphitheater and evening admissions; making a total decrease of only $3,142.42. This is remarkable, considering the unfavorable weather conditions which prevailed throughout the entire week of the fair.

From What Sources.	Receipts, 1902	Receipts, 1903.	Increase.	Decrease.
Gate receipts	$35,496.00	$36,010.36	$ 514.36	
Day amphitheater receipts	3,789.75	2,577.10		$ 1,212.65
Evening admissions	1,496 00	511.25		984.75
Evening amphitheater receipts	5,851.50	2,724.00		3,127.50
Quarter stretch receipts	3.25	21 00	17.75	
From all other sources, not including $37,000 appropriated for stock pavilion in 1902	20,485.27	22,135.64	1,650.37	
Totals	$67,121 77	$63,979.35	$ 2,182.48	$ 5,324.90
Totals	63,979 35			2,182.48
Totals	$ 3,142 42			$ 3,142.42

STATEMENT OF PREMIUMS PAID IN 1903.

Department A, horses	$ 2,501.00
Department B, cattle	5,208.00
Department D, swine	1,316.00
Department E, sheep	1,081.00
Department F, poultry	763.50
Department I, grains, grasses and seeds	1,584.50
Department J, pantry and kitchen	636.00
Department K, dairy products	699.13
Department L, fruits	473.50
Department M, plants and flowers	510.00
Department N, mechanical and fine arts	2,499.00
Department N, children's	277.00
Department B, speed	6,113.50
Premiums on corn at convention December, 1902	151.00
Total	$23,813.13

Mr. R. T. St. John of Mitchell county moved that a committee be appointed on the address of the president, and reports of secretary and treasurer. Vice President C. E. Cameron, occupying the chair, appointed as such committee, R. T. St. John of Mitchell county, B. L. Manwell of Black Hawk county and W. J. Scott of Ida county.

Mr. F. R. Conaway, secretary of the Iowa Louisiana Purchase Exposition Commission, appeared before the convention and read a paper on "The Work of the Iowa Commission to the Louisiana Exposition."

Mr. Miller appeared before the convention and extended in behalf of Charles Aldrich, curator of the State Historical Department, an invitation to the delegates to call at the Historical Building and enjoy the many pleasures of an inspection of that department.

Mr. S. B. Packard moved that the convention be now adjourned until 1:30 o'clock P.M., which motion prevailed.

AFTERNOON SESSION.

Pursuant to adjournment the convention met at 1:30 o'clock with President Morrow in the chair.

Meeting called to order and the convention listened to the reading of report on credentials as follows:

REPORT OF COMMITTEE ON CREDENTIALS.

Delegates to Agricultural Convention, 1903.

Adams County Agricultural Society—W. J. Drennan, Corning.

Audubon County Agricultural Society—W. H. Edwards, Audubon.

Black Hawk County Agricultural Society—La Porte City District, B. L. Manwell, La Porte City.

Bremer County—Elmer M. Reeves, Waverly.

Buchanan County Agricultural Society—S. P. Spangler, Aurora.

Buena Vista County Agricultural Society—C. E. Cameron, Alta.

Cerro Gordo County—W. A. Burnap, Mason City.

Clayton County Agricultural Society—Strawberry Point District—J. C. Flenniken, Strawberry Point.

Davis County Agricultural Society—H. Wray, Bloomfield.

Delaware County Agricultural Society—M. S. Van Auken, Manchester.

Dubuque County—Thos. H. McQuillan, Cascade.

Franklin County Agricultural Society—S. W. Ferris, Hampton.

Greene County—Amos Johnson.

Grundy County Agricultural Society—E. A. Crary, Grundy Center.

Guthrie County Agricultural Society—A. H. Grissell, Guthrie Center.

Hancock County Agricultural Society—Geo. P. Hardwick, Britt.

Hardin County Agricultural Society—Robert Smith, Eldora.

Henry County Agricultural Society—C. M. Clark, Mount Pleasant.

Ida County—W. J. Scott, Ida Grove.

Iowa County Agricultural Society—Williamsburg District—F. O. Harrington, Williamsburg.

Jackson County Agricultural Society—C. W. Phillips, Maquoketa.

Jasper County Agricultural Society—W. J. Miller, Metz.

Jefferson County Agricultural Society—J. P. Manatrey, Fairfield.

Keokuk County Agricultural Society—What Cheer District—T. C. Legoe, What Cheer.

Kossuth County Agricultural Society—J. W. Wadsworth, Algona.

Louisa County Agricultural Society—Columbus Junction District—F. L. Molsberry, Columbus Junction.

Madison County Agricultural Society—I. J. Hudson, Winterset.

Mahaska County Agricultural Society—Edward Pritchett, Oskaloosa.

Marion County Agricultural Society—Lake Prairie District—Chas. Porter, Pella.

Marshall County—S. B. Packard, Marshalltown.

Mills County Agricultural Society—H. Byers, Glenwood.

Monona County—Harold Pike, Whiting.

Monroe County—John Foster, Albia.

Montgomery County Agricultural Society—W. S. Ellis, Red Oak.

Muscatine County Agricultural Society—Union District—Eb. Fogg, West Liberty.

Page County Agricultural Society—Shenandoah District—E. S. Welch, Shenandoah.

Polk County—Lew Burnett, Des Moines.

Poweshiek County Agricultural Society—Central at Malcom—James Nowak, Malcom.

Poweshiek County Agricultural Society—Central at Grinnell—S. Jacob, Grinnell.

Ringgold County Agricultural Society—C. G. Stranahan, Mount Ayr.

Sac County Agricultural Society—V. S. De Lay, Odebolt.

Shelby County Agricultural Society—H. W. Byers, Harlan.

Sioux County Agricultural Society—J. F. Morris, Ireton.

Union County—W. W. Morrow, Afton.

Van Buren County—W. A. Duckworth, Keosauqua.

Wapello County—W. O. Bagley, Eldon.

Warren County Agricultural Society—C. F. Moorman, Indianola.

Washington County—D. J. Palmer, Washington.

Webster County—M. J. Haire, Fort Dodge.

Wright County Agricultural Society—W. C. Brown, Clarion.

FARMERS' INSTITUTES.

Audubon County—A. H. Edwards, Audubon.

Black Hawk County—Chas. E. Hearst, Waterloo.

Buena Vista County—C. E. Cameron, Alta.

Calhoun County—A. T. Jamison, Lohrville.

Cherokee County—W. P. Dawson, Quimby.

Clinton County—Geo. S. Forest, Miles.

Dallas County—John Fox, Dallas Center.

Iowa County—F. O. Harrington, Williamsburg.

Polk County—A. L. Plummer, Altoona.

Winnebago County—Eugene Secor, Forest City.

Jos. H. Wadsworth,
Chas. E. Hearst,
C. G. Stranahan,
Committee.

Mr. A. H. Grissell of Guthrie county moved the adoption of the report as read, and that committee making report be discharged, which motion was seconded and prevailed.

The report of the committee on address of the president, and reports of the secretary and treasurer was read as follows:

To the President and Members of the Agricultural Convention:

We, your committee, to whom has been referred the address of the president and reports of the secretary and treasurer of the Department of Agriculture, beg leave to submit the following:

We hereby indorse the administration of President W. W. Morrow, and congratulate the State that during his term of office the affairs of the department have been attended to with unprecedented success.

The thanks of the convention are due, and are hereby tendered to him, as a thoroughly competent and faithful official and for his zealous and official work. That during the term of office held by the president, W. W. Morrow, improvements have been made at a large expenditure of money which was under his direct supervision, and we therefore commend him for the admirable manner in which the plans of the department were carried into execution, and for the economical expenditure of the department's funds.

We fully endorse his views of excluding all side shows of an objectionable nature, but there may be shows that are entirely unobjectionable, that are not only entertaining but instructive, and add to the attraction of the fair. We, therefore, suggest that the society use due discrimination in the selection of these shows.

The secretary's report is a most comprehensive outline of the year's business, and contains many valuable suggestions which are highly commended by your committee, especially is this true in reference to the making of permanent and lasting improvements.

Your committee wish to commend the secretary for the admirable executive ability he has displayed in carrying on the business of the department the past year, and we also desire to commend him for the promptness with which he completed the entry books of the fair and placed them in the hands of the judges of the different departments, thereby hastening the business of the fair.

We also commend G. D. Ellyson, the treasurer, for the careful and judicious handling of the funds of the society, and recommend that he be accorded the thanks of the directors of the Iowa State Fair.

R. T. St. John,
B. L. Manwell.
W. J. Scott,
Committee.

Mr. Geo. S. Forest of Jackson county moved the adoption of the report as read. Motion prevailed.

Convention now proceeded to the election of officers.

The president appointed R. T. St. John of Mitchell county, J. F. Morris of Sioux county and Chas. Porter of Marion county as tellers.

R. T. St. John placed in nomination for the office of president for the ensuing year W. W. Morrow of Union county to succeed himself, and moved that if there were no other nominations that the rules be suspended and the secretary instructed to cast the unanimous vote of the convention for W. W. Morrow. Motion prevailed. The secretary so cast the vote, and Mr. Morrow was declared to have been duly elected president of the Department of Agriculture for the ensuing year.

M. J. Wragg placed in nomination for the office of vice president C. E. Cameron of Buena Vista county, to succeed himself, and moved that if there were no other nominations that the rules be suspended and the secretary instructed to cast the unanimous vote of the convention for Mr. Cameron. Motion prevailed. The secretary so cast the vote and the president declared Mr. Cameron duly elected vice president of the Department of Agriculture for the ensuing year.

J. P. Manatrey of Jefferson county and R. S. Johnston of Louisa county were placed in nomination for member of the State Board of Agriculture from the First district. The roll was called by the secretary and the vote cast, and the tellers reported the result of the ballot as follows: Total number of votes cast eighty-eight, of which R. S. Johnston received forty-nine votes and J. P. Manatrey twenty-nine. R. S. Johnston having received the majority of the votes cast, was declared by the president to have been duly elected as a member of the board from the First district.

B. L. Manwell of Black Hawk county placed in nomination for member of the State Board of Agriculture from the Third district, W. C. Brown of Wright county, to succeed himself, which motion was seconded by E. M. Reeves of Bremer county. It was moved that if there were no other nominations that the rules be suspended and the secretary instructed to cast the unanimous vote of the convention for Mr. Brown. Motion prevailed. The secretary so cast the vote and the president declared W. C. Brown duly elected as member of the board from the Third district.

M. McDonald of Guthrie county placed in nomination for member of the State Board of Agriculture from the Fifth district S. B. Packard, to succeed himself, and moved that if there were no other nominations that the rules be suspended and the secretary instructed to cast the unanimous vote of the convention for Mr. Packard, which motion was seconded by Mr. McCrary of Grundy county, and prevailed. The secretary so cast the vote and the president declared S. B. Packard duly elected as member of the board from the Fifth district.

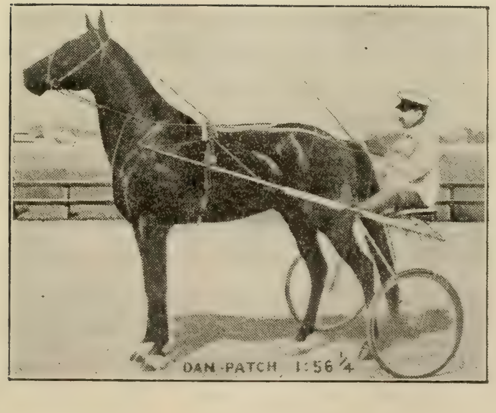
S. B. Packard placed in nomination for member of the State Board of Agriculture from the Seventh district M. J. Wragg of Dallas county, to succeed himself, and moved that if there were no other nominations that the rules be suspended and the secretary instructed to cast the unanimous vote of the convention for Mr. Wragg. Motion prevailed. The secretary so cast the vote and the president declared M. J. Wragg duly elected as member of the board from the Seventh district.

H. W. Byers of Shelby county placed in nomination for member of the State Board of Agriculture from the Ninth district M. McDonald of Guthrie county, to succeed himself. W. S. Ellis placed in nomination for member of the board from the same district J. M. Hull of Montgomery county. The secretary called the roll and the vote was cast and the tellers reported the result of the ballot as follows: Total number of votes cast, seventy-four, of which M. McDonald received fifty-eight (58), and Mr. Hull sixteen (16). M. McDonald, having received the majority of the votes cast, was declared by the president to have been duly elected as member of the board from the Ninth district. W. S. Ellis moved that the vote be stricken out and Mr. McDonald declared unanimously elected, which motion was put to the convention and prevailed.

Geo. S. Forest of Jackson county placed in nomination for member of the State Board of Agriculture from the Eleventh district H. L. Pike of Monona county, to succeed himself, which motion was seconded by W. J. Scott of Ida county and moved that if there were no other nominations that the rules be suspended and the secretary instructed to cast the unanimous vote of the convention for Mr. Pike. Motion prevailed. The secretary so cast the vote and the president declared H. L. Pike duly elected as member of the board from the Eleventh district.

There being no further business, Mr. A. H. Grissell moved that the convention be now adjourned. Motion prevailed and the president declared the convention adjourned.

J. C. Simpson, Secretary.



MEETING OF THE STATE BOARD OF AGRICULTURE, DECEMBER, 1903.

THURSDAY MORNING, DECEMBER 10, 1903.

Board met at 9 o'clock A.M., with President Morrow in the chair.

On roll call the following members were found to be present: Morrow, Cameron, Simpson, Ellyson, Johnston, Brown, Packard, Legoe, Wragg, Ledgerwood, McDonald, Wadsworth, Pike, Wright and Phillips.

Hon. John Crockett, clerk of the supreme court of the State of Iowa, was called in and administered the oath of office to the newly elected members.

Mr. Wragg placed in nomination for secretary, to succeed himself, J. C. Simpson; that the salary of secretary be $1,500 per annum, and moved that the rules be suspended and the president authorized to cast the entire vote of the board for Mr. Simpson. The vote was so cast and the president declared J. C. Simpson duly elected as secretary of the State Board of Agriculture for the ensuing year.

Mr. Legoe placed in nomination for treasurer to succeed, himself, G. D. Ellyson, and moved that the rules be suspended and the secretary authorized to cast the entire vote of the board for Mr. Ellyson. The vote was so cast and the president declared G. D. Ellyson duly elected treasurer of the State Board of Agriculture for the ensuing year. The salary of treasurer was fixed at $100 per annum.

Minutes of the last board meeting, auditing and executive committees were read and on motion of Mr. Packard approved.

Mr. Packard moved that Mr. Jas. H. Deemer be elected superintendent of grounds, to succeed himself, at a salary of $800 per annum. Motion prevailed.

Mr. Ledgerwood moved that Garth C. Fuller be selected as assistant secretary at a salary of $75 per month. Motion prevailed.

Mr. Legoe placed in nomination for chief of police Mr. Donald Hill of Buena Vista county, and moved that the rules be suspended and the secretary instructed to cast the entire vote of the board for Mr. Hill. The vote was so cast and the president declared Mr. Hill duly elected chief of police for the fair of 1904.

Mr. Packard placed in nomination for chief marshal Mr. T. D. Doke of Davis county; there being no other nominations, it was moved that the rules be suspended and the secretary instructed to cast the entire vote of the board for Mr. Doke. The secretary so cast the vote and the president declared Mr. Doke duly elected as chief marshal for the fair of 1904.

T. J. Hudson of Madison county and C. M. Akes of Decatur county were duly elected as assistant marshals.

Mr. McDonald moved that the salary of chief marshal, assistant marshals, chief of police, gate keepers, superintendents, assistant superintendents and all other assistants be the same as for the year of 1903, which was seconded, and motion prevailed. Salaries are as follows:

Superintendents, not members of board	$4.75 per day and actual railroad fare
Assistant superintendents	$3.75 per day and actual railroad fare
Other help in departments not to exceed	$3.25 per day
Two assistant treasurers	$5.75 per day each
Ticket sellers	$3.25 per day
Police	$2.50 per day
Mounted police	$3.00 per day
Gate keepers	$2.50 per day
Captains of gates	$3.25 per day
Chief marshal	$50.00
Two assistant marshals	$30.00 each
Chief of police	$5.00 per day
Assistant chief of police	$3.25 per day and actual railroad fare

Mr. McDonald moved that a fair be held in 1904 on the dates recommended at the meeting of the American Association of Fairs and Expositions at Chicago, viz: August 19th to 28th, which was seconded by Mr. Wright. The motion was put to vote and on roll call the following members voted in the affirmative: Johnston, Phillips, Brown, Packard, Legoe, Wragg, Ledgerwood, McDonald, Pike, Wright, Morrow, Cameron, Simpson and Ellyson. Those voting in the negative: St. John and Wadsworth. Result of vote was announced and the president declared the motion to have carried.

Mr. Cameron moved that the board recommend to the governor for reappointment as director of the Iowa Weather and Crop Service Mr. J. R. Sage of Polk county. Seconded by Wadsworth and motion prevailed.

On motion the board adjourned to meet at 1:30 o'clock P.M.

AFTERNOON SESSION.

Board met pursuant to adjournment, and on roll call all members were found to be present except the Governor, President of the Iowa State College, Koto and Ellyson.

Secretary presented bill of Mr. John Cownie for $25 for services rendered as superintendent of the electric light plant at the fair of 1903. On motion of Mr. Wadsworth bill was allowed, and the secretary authorized to issue warrant in payment therefor.

Secretary presented bill from Mr. Cownie for $60 for eighty police billies, purchased from the Institute for Feeble-Minded at Glenwood, and on motion of Mr. Brown the bill was allowed and the secretary authorized to draw warrant in payment therefor.

Mr. Cameron moved that the rental of pens in the swine department be placed at $1 each, size of pen 4 feet by 8 feet. Seconded by Ledgerwood and motion prevailed.

Mr. Packard sumbitted report of committee on adulteration of foods and seeds.

Mr. Cameron moved the following resolution:

Resolved, That the report of the committee on adulteration of foods and seeds be received and adopted, and that a copy be forwarded to the Governor and members of the Thirtieth General Assembly for consideration.

Mr. Packard offered the following resolution, which was adopted:

> Resolved, That the executive committee have prepared a plan showing a perspective and ground plan of a fireproof building of suitable dimensions to hold the exhibits of agriculture, horticulture and dairy departments, with estimates of the cost.
>
> Also, the cost of remodeling the old horticultural building for use as a woman's building and an emergency hospital.
>
> Also, the cost of three hog barns.
>
> Also, fireproof building for the power house and pumping station.
>
> Also, the cost of repairing the agricultural building for use as a poultry building.
>
> Be it further resolved,—That the executive committee prepare and present to the Thirtieth General Assembly a bill for an appropriation to cover the cost of the improvements above named.

Mr. McDonald moved that the executive committee be authorized to see what the purchase of the land lying south of the fair grounds would cost, and what the land belonging to the State and lying on the east of the fair grounds could be sold for, and confer with the executive council in regard to the sale and purchase of same. Seconded by Packard and motion prevailed.

Mr. Wadsworth moved that the grounds north of Grand Avenue between the west fence and the ditch be set aside for the location of city buildings. Motion prevailed.

The assignment of superintendents of departments for the fair of 1904 was delegated to the executive committee.

Mr. Packard moved that the executive committee take proper steps to have ditch running through the west part of the fair grounds opened to a proper width and depth for drainage. Motion prevailed.

The executive committee presented the following assignment of superintendent for the fair of 1904, and on motion of Mr. McDonald report was adopted:

Superintendent of tickets	C. W. Phillips
Superintendent of gates	T. C. Legoe
Superintendent of privileges	J. W. Wadsworth
Superintendent of horses	W. C. Brown
Superintendent of speed	C. E. Cameron
Superintendent of cattle	S. B. Packard
Superintendent of swine	R. S. Johnston

Superintendent of sheep and poultry	H. L. Pike
Superintendent of machinery	John Ledgerwood
Superintendent of agriculture	R. T. St. John
Superintendent of horticulture	M. J. Wragg
Superintendent of dairy	H. R. Wright
Superintendent of fine arts	M. McDonald

On motion of Mr. Packard meeting adjourned until 9 o'clock A.M., tomorrow morning.

FRIDAY MORNING, DECEMBER 11, 1903.

Board met pursuant to adjournment, and on roll call all members were found to be present except Gov. A. B. Cummins, Dr. A. B. Storms, P. O. Koto and G. D. Ellyson.

Minutes of Thursday's meeting were read and approved.

The president announced the appointment of committees as follows:

Resolutions—R. T. St. John, M. McDonald and T. C. Legoe.

Powers and Duties of the Board—Gov. A. B. Cummins, W. W. Morrow and C. E. Cameron.

Adulteration of Foods, Seeds and Other Products—S. B. Packard, M. J. Wragg and H. R. Wright.

Dairy Industry and Products—H. R. Wright, T. C. Legoe and John Ledgerwood.

Contagious Diseases Among Domestic Animals—P. O. Koto, H. L. Pike and R. S. Johnston.

Auditing Committee—J. W. Wadsworth, W. C. Brown and C. W. Phillips.

Mr. Packard, chairman of the committee on food adulterations, submitted a statement of the expenses incurred for the year of 1903, as follows:

To J. B. Weems, chemist	$50.00
To S. B. Packard, expenses	14.80
To M. J. Wragg, expenses	11.16
Total	$75.96

Secretary read estimate drawn by the executive committee on expenditure of funds for year of 1904, as follows:

Expenses for fair of 1904, including bills on file, which necessarily will have to be paid out of moneys on hand before fair of 1904 is held	$ 5,000.00
Removal of horse barns Nos. 10, 11 and 12	1,000.00
Remodeling agricultural and poultry buildings	500.00
Repairs on roof of agricultural building	200.00
Repairs and reroofing a number of horse barns	1,150.00
Painting roof and interior iron work of stock pavilion	400.00
Sidewalks	1,000.00
Salary superintendent of fair grounds	800.00
Drainage	500.00
Repairing race track	200.00
Planting trees	50.00
Contingent fund for repairs and improvements	3,000.00
Total	$16,800.00

Mr. McDonald moved that the report of the executive committee on improvements be approved. Motion prevailed.

Mr. Wadsworth moved that Thursday, August 23d, of the fair of 1904, be designated as "Old Soldiers' and Children's Day" and that the admission of old soldiers and children on this day be the same as last year. Seconded by McDonald and motion prevailed.

Mr. Packard moved that in the Holstein and Jersey classes that the fourth (4th) and fifth (5th) premiums be dropped, and that a "calf herd" be inserted in the four beef classes; premiums to be $20, $15, $12, $8 and $5. Mr. Packard also moved that classes be made for "Iowa Exhibitors" in the three beef herds, viz: Shorthorn, Hereford and Angus, and that the first and second money winners in the open classes—should they be Iowa cattle—be barred from showing or drawing premiums in the Iowa classes. Premiums offered to be as follows, and shall be the same in the three classes:

INDIVIDUALS.

Bull 3 years old and over	$10	$7	$5	$3	$2
Bull 2 years and under 3	10	7	5	3	2
Bull 1 year and under 2	10	7	5	3	.2
Bull calf under 1 year	10	7	5	3	2
Cow 3 years old or over	10	7	5	3	2
Heifer 2 years and under 3	10	7	5	3	2
Heifer 1 year and under 2	10	7	5	3	2
Heifer calf under 1 year	10	7	5	3	2

EXHIBITORS' HERD.

Herd to consist of one bull 2 years old or over, one cow 3 years old or over, one heifer 2 years old and under 3, one heifer 1 year old and under 2, one heifer under 1 year old	$12	$8	$5

BREEDERS' YOUNG HERD.

Herd to consist of one bull under 2 years, two heifers 1 year and under 2, and two heifer calves under 1 year, all except the bull to be bred by the exhibitor	$12	$8	5

GET OF SIRE.

Four animals of either sex, the get of one sire	$10	$7	$5

PRODUCE OF COW.

Two animals of either sex, the produce of one cow	$8	$6	$4

SWEEPSTAKES.

Not less than two entries required in this class.

Bull any age	$10
Cow any age	10

The above motion was seconded by Mr. Phillips, and the roll call resulted as follows: Those voting in the affirmative were: Johnston, Phillips, St. John, Packard, Pike, Wright, Cameron and Simpson, total being 8. Negatives: Brown, Legoe, Wragg, McDonald, Wadsworth and Morrow, total being 6. The president declared the motion to have carried.

Other changes for list of 1904, see premium list.

Mr. Wadsworth moved that a class for Yorkshire hogs be added to the swine department, and that premiums not exceeding $200 be offered for same. Seconded by Johnston and motion prevailed.

Mr. Pike moved that a separate class be made for Delaine Merino. Motion prevailed.

Mr. Pike moved that a premium be offered in all sheep classes for "pen of four lambs," the get of one ram, the ram need not be shown. Motion prevailed.

Upon motion of Mr. Johnston board adjourned to meet at 1:30 o'clock P.M.

AFTERNOON SESSION.

Board met pursuant to adjournment, and on roll call the following members were found to be present: Wright Morrow.

Cameron, Phillips, Brown, St. John, Packard, Legoe, Pike and Simpson. Messrs. Johnston, Wragg, Wadsworth and McDonald came in later.

Mr. Wright moved that the exhibit of cheese be limited to Iowa exhibitors, and that all cheese must be exhibited by the maker. Motion prevailed.

Mr. St. John moved that the superintendents of agriculture, horticulture, exposition and all other halls, have the privilege of selecting from the corps of police one man for duty in the respective halls. Motion prevailed.

Mr. Wragg moved that $100 be added to the premiums in the horticultural department. Motion prevailed.

Mr. St. John moved that it is the sense of this board that night attractions be provided for the fair of 1904, and that the matter be left in the hands of the executive committee.

Mr. Brown moved that the executive committee act as the legislative committee, and that they be empowered to call in members of the board from time to time as they may deem it necessary. Seconded by Legoe and motion prevailed.

Mr. Wragg moved that a committee on per diem and mileage be appointed. This motion prevailed and the president appointed as such committee Messrs. Wragg, St. John and Pike.

Mr. Wragg made the report of committee on per diem and mileage as follows:

Name.	Days	Rate.	Amount.	Miles.	Amount.	Total.
W. W. Morrow	6	$ 4.00	$ 24 00	82	$ 8.20	$ 32.20
C E. Cameron	6	4 00	24.00	140	14.00	38.00
R. S. Johnston	3	4.00	12.00	158	....	12.00
W. C. Brown	6	4.00	24.00	102	10 20	34.20
S. B. Packard	6	4.00	24.00	54	5.40	29.40
H. L. Pike	6	4.00	24.00	200	20.00	44 00
John Ledgerwood	6	4 00	24.00	89	8 90	32.90
R. T. St. John	6	4.00	24 00	195	19.50	43 50
M. McDonald	6	4 00	24.00	65	6.50	30.50
M. J. Wragg	6	4.00	24.00	16	1.60	25.60
J. W. Wadsworth	6	4.00	24.00	123	12 30	36.30
T. C. Legoe	6	4.00	24.00	100	10.00	34.00
C. W. Phillips	6	4.00	24.00	....	....	24.00
J. P. Manatrey	3	4.00	12.00	118	12.80	23.80
Total	....	....	....	....	....	$440 40

M. J. Wragg,
H. L. Pike,
R. T. St. John,
Committee.

Mr. Wragg moved that all unfinished business be delegated to the executive committee, with power to act. Motion prevailed.

It was moved by Mr. Packard that the "Judging Contest" for the Iowa State College scholarship be included in the premium list. Motion prevailed.

Mr. Cameron moved that the board now adjourn, to meet at call of president. This motion prevailed and the president declared the meeting adjourned.

J. C. SIMPSON, Secretary.

PART II.

REPORT OF THE IOWA WEATHER AND CROP SERVICE FOR 1903.

WITH A SUMMARY OF IOWA WEATHER AND CROPS FOR A SERIES OF YEARS.

John R. Sage, Director.

CLIMATOLOGY OF THE YEAR 1903.

Barometer.—The mean pressure for the year was 30.04 inches. The highest observed pressure was 30.68 inches on February 18th and December 14th at Des Moines; the lowest pressure, 29.19 inches, on October 6th at Sioux City. Range for the State 1.49 inches.

Temperature.—The mean temperature for the State was 47.3°, which is 0.3° below normal. The highest temperature reported was 101° on August 24th at Logan. The lowest temperature reported was 27° below zero on December 13th at Sibley. Range for the year 128°.

Precipitation.—The average amount of rain and melted snow for the year, as shown by complete records of ninety-five stations, was 35.66 inches, which is 4.75 inches above the normal, and 8.65 inches below the average amount for 1902. The greatest amount recorded at any station for the year was 50.53 inches at Onawa. Least amount recorded 26.41 inches at Ames. The greatest monthly rainfall was 17.74 inches at Woodburn in August; least monthly amount, a trace at Afton and thirteen other stations in January, November and December; the greatest amount in any consecutive twenty-four hours was 11.22 inches at Cherokee, August 27th. The average number of days in which .01 inch or more of rain fell was ninety-two.

Wind and Weather.—The prevailing direction of wind was northwest. Highest velocity reported, seventy-two miles an hour, in Sioux City, from the northwest and southeast on January 6th and May 21st. Average daily wind movement 210 miles. There were 156 clear days, 100 partly cloudy and 109 cloudy days; as against 145 clear days, 111 cloudy and 109 partly cloudy in 1902.

MONTHLY SUMMARIES.

JANUARY.—The monthly mean temperature for the State, as shown by records of one hundred and five stations was 23.0°, which is 3.5° above normal. By sections the mean temperatures were as follows: Northern section, 19.8°; central section, 22.8°; southern section, 25.8°. The highest monthly mean was 27.8°, at Red Oak; lowest monthly mean, 17.5°, at New Hampton. The highest temperature reported was 60°, at Belknap, on the 1st; lowest temperature reported, 12°, at Clear Lake, on the 11th. The average monthly maximum was 46.7°; average monthly minimum, 6.2°. Greatest daily range, 45°, at Carroll; average of greatest daily ranges, 32.1°. Average precipitation for the State, as shown by records of 120 stations, was 0.28 inch which is .74 of an inch below normal. The averages by sections were as follows: Northern section, .21; central section, .29; southern section, .28. The largest amount reported was 1.46 inches, at Fort Madison; least amount reported, a trace, at Charles City, Carroll, Cumberland, Afton, Atlantic, Thurman and Winterset. The greatest daily rainfall reported was .70 of an inch at Danville on the 2d. Average number of days on which .01 of an inch or more was reported, 4. Prevailing direction of wind, northwest; highest velocity reported, 72 miles per hour, from the northwest, at Sioux City, on the 6th. Average number of clear days, 13; partly cloudy, 7; cloudy, 11.

FEBRUARY.—The monthly mean temperature for the State, as shown by the records of 108 stations, was 19.8°, which is 0.2° below normal. By sections the mean temperatures were as follows: Northern section, 17.2°; central section, 20.2°; southern section, 22.1°. The highest monthly mean was 26.4° at Keokuk; lowest mean, 14.2°, at Estherville. The highest temperature reported was 56°, at Eldon, on the 2d; lowest temperature reported, 21°, at Clear Lake, Estherville and Sioux Center, on the 16th, 17th and 18th. The average monthly maximum was 45.7°; average monthly minimum, 16.4°. Greatest daily range, 44°, at Villisca; average of greatest daily ranges, 35.8°. Average precipitation for the State, as shown by records of 120 stations, was 1.18 inches, which is .09 of an inch above normal. The averages by sections were as follows: Northern section, 1.02 inches; central section, 1.13 inches; southern section, 1.38 inches. The largest amount reported was 3.25 inches at Danville; least amount reported, .30 of an inch, at Galva. The greatest daily rainfall reported was 1.50 inches at Indianola, on the 4th. Average number of days on which .01 of an inch or more was reported, 4. Prevailing direction of the wind, northwest; highest velocity reported, 52 miles per hour, from the northwest, at Sioux City, on the 28th. Average number of clear days, 13; partly cloudy, 7; cloudy, 8.

MARCH.—The monthly mean temperature for the State, as shown by records of 114 stations, was 38.8°, which is 6.6° above normal. By sections the mean temperatures were as follows: Northern section, 36.1°; central section, 39.4°; southern section, 41.1°. The highest monthly mean was 45.0° at Eldon; lowest monthly mean, 30.8° at Sibley. The highest temperature reported was 82°, at Mount Pleasant, on the 14th; lowest temperature reported, 6°, at Baxter and Clear Lake, on the 1st. The average monthly maximum was 72.1°; average monthly minimum, 11.2°. Greatest daily range, 48°, at Monticello; average of greatest daily ranges, 35.3°. Average precipitation for the State, as shown by records of 126 stations, was 1.38 inches, which is 0.53 of an inch below normal. The averages by sections were as follows: Northern section, 1.40 inches; central section, 1.34 inches; southern section, 1.39 inches. The largest amount reported was 3.90 inches at LeMars; least amount reported, .15 of an inch at Denison and Ruthven. The greatest daily rainfall reported was 1.80 inches at Keokuk on the 7th. Average number of days on which .01 of an inch or more was reported, 7. Prevailing direction of the wind, southwest; highest velocity reported, 41 miles per hour, from the northwest, at Sioux City, on the 23d. Average number of clear days, 11; partly cloudy, 7; cloudy, 13.

April.—The monthly mean temperature for the State, as shown by records of 107 stations, was 49.8°, which is 0.3° above normal. By sections the mean temperatures were as follows: Northern section, 47.6°; central section, 50.0°; southern section, 51.8°. The highest monthly mean was 53.8°, at Burlington; lowest monthly mean, 44.9°, at Forest City. The highest temperature reported was 86°, at Mt. Vernon on the 11th; lowest temperature reported, 17°, at Larchwood, on the 30th. The average monthly maximum was 77.4°; average monthly minimum, 25.0°. Greatest daily range, 52°, at Stuart; average of greatest daily ranges, 39.7°. Average precipitation for the State, as shown by records of 120 stations, was 2.98 inches, which is 0.03 of an inch below normal. The averages by sections were as follows: Northern section, 3.38 inches; central section, 2.89 inches; southern section, 2.67 inches. The largest amount reported was 6.00 inches, at Grand Meadow; least amount reported, 0.74 of an inch, at Logan. The greatest daily rainfall reported was 3.16 inches, at Columbus Junction, on the 10th and 11th. Average number of days on which .01 of an inch or more was reported, 9. Prevailing direction of the wind, northwest; highest velocity reported, 45 miles per hour, from the south, at Sioux City, on the 27th. Average number of clear days, 11; partly cloudy, 9; cloudy, 10.

May.—The monthly mean temperature for the State, as shown by records of 117 stations, was 61.6°, which is 1.4 above normal. By sections the mean temperatures were as follows: Northern section, 60.4°; central section, 61.9°; southern section, 62.6°. The highest monthly mean was 65.2°, at Burlington; lowest monthly mean, 55.2°, at Estherville. The highest temperature reported was 91°, at Clinton, on the 20th; lowest temperature reported, 24°, at Bedford and Earlham, on the 1st and 3d. The average monthly maximum was 83.3°; average monthly minimum, 29.6°. Greatest daily range, 49°, at Larchwood; average of greatest daily ranges, 33.8°. Average precipitation for the State, as shown by records of 129 stations, was 8.55 inches, which is 4.52 inches above normal. The averages by sections were as follows: Northern section, 8.11 inches; central section, 8.73 inches; southern section, 8.80 inches. The largest amount reported was 15.45 inches, at Thurman; least amount reported, 2.88 inches, at Fort Madison. The greatest daily rainfall reported was 4.80 inches, at Thurman, on the 22d. Average number of days on which .01 of an inch or more was reported, 16. Prevailing direction of the wind, southeast; highest velocity reported, 72 miles per hour, from the southeast, at Sioux City, on the 21st. Average number of clear days, 9; partly cloudy, 12; cloudy, 10.

JUNE.—The monthly mean temperature for the State, as shown by records of 109 stations, was 64.6°, which is 5.6° below normal. By sections the mean temperatures were as follows: Northern section, 64.1°; central section, 64.5°; southern section, 65.3°. The highest monthly mean was 67.8°, at Tipton; lowest monthly mean, 59.4°, at Ogden. The highest temperature was 96°, at Cedar Rapids and Sigourney, on the 26th and 30th; lowest temperature reported, 30°, at Denison, on the 4th. The average monthly maximum was 89.7°; average monthly minimum, 38.6°. Greatest daily range, 50°, at Scranton; average of greatest daily ranges 34.1°. Average precipitation for the State, as shown by records of 125 stations, was 2.86 inches, which is 1.52 inches below normal. The averages by sections were as follows: Northern section, 2.84 inches; central section, 2.89 inches; southern section, 2.85 inches. The largest amount reported was 6.04 inches at Humboldt; least amount reported, .75 of an inch, at West Union. The greatest daily rainfall reported was 3.00 inches at Washta, on the 30th. Average number of days on which .01 of an inch or more was reported, 10. Prevailing direction of the wind, northwest; highest velocity reported, 66 miles per hour, from the northwest, at Sioux City, on the 8th. Average number of clear days, 13; partly cloudy, 10; cloudy, 7.

JULY.—The monthly mean temperature for the State as shown by the records of 112 stations, was 72.9°, which is 1.5° below normal. By sections the mean temperatures were as follows: Northern section, 71.0°; southern section, 74.7°. The highest monthly mean was 77.4°, at Keokuk; lowest monthly mean, 68.5°, at New Hampton. The highest temperature reported was 100°, at Thurman and Sigourney, on the 9th and 27th; lowest temperature reported, 40°, at Chester, on the 31st. The average monthly maximum was 92.7°; average monthly minimum, 46.4°. Greatest daily range, 39°, at Lansing, Clarinda, Earlham; average of greatest daily ranges, 31.3°. Average precipitation for the States, as shown by records of 124 stations was 4.83°, which is .91 of an inch above normal. The averages by sections were as follows: Northern section, 6.49 inches; central section, 5.28 inches; southern section, 2.73 inches. The largest amount reported was 12.72 inches at Elkader; least amount reported, .94 of an inch at Belknap. The greatest daily rainfall reported was 5.12 inches, at Delaware, on the 10th. Average number of days on which .01 of an inch or more was reported, 9. Prevailing direction of the wind, south; highest velocity, 48 miles per hour, from the northwest, at Sioux

City, on the 1st. Average number of clear days, 17; partly cloudy, 9; cloudy, 5.

August.—The mean monthly temperature for the State, as shown by records of 99 stations, was 69.1°, which is 3.1° below normal. By sections the mean temperatures were as follows: Northern section, 67.0°; central section, 69.3°; southern section, 70.9°. The highest monthly mean was 75.0°, at Logan; lowest monthly mean, 63.8°, at New Hampton. The highest temperature reported was 101°, at Logan, on the 24th; lowest temperature reported, 41°, at Ogden, on the 31st. The average monthly maximum was 91.6°; average monthly minimum, 47.3°. Greatest daily range, 45°, at Logan; average of greatest daily ranges, 31.4°. Average precipitation for the State, as shown by records of 110 stations, was 6.64 inches, which is 3.45 inches above normal. The averages by sections were as follows: Northern section, 5.51 inches; central section, 5.67 inches; southern section, 8.74 inches. The largest amount reported was 17.74 inches, at Woodburn; least amount reported, 2.55 inches, at Toledo. The greatest daily rainfall reported was 11.22 inches, at Chariton, on the 27th. Average number of days on which .01 of an inch or more was reported, 11. Prevailing direction of the wind, southwest; highest velocity reported, 44 miles per hour, from the southeast, at Sioux City, on the 1st. Average number of clear days, 12; partly cloudy, 10; cloudy, 9.

September.—The monthly mean temperature for the State, as shown by records of 104 stations, was 60.8°, which is 3.4° below normal. By sections the mean temperatures were as follows: Northern section, 59.0°; central section, 61.1°; southern section, 62.4°. The highest monthly mean was 66.2°, at Belknap; lowest monthly mean, 56.9°, at Forest City. The highest temperature reported was 94°, at Logan, on the 1st; lowest temperature reported, 28°, at Larchwood, on the 16th. The average monthly maximum was 84.8°; average monthly minimum, 33.6°. Greatest daily range, 51°, at Clarinda and Marshalltown; average of greatest daily ranges, 34.8°. Average precipitation for the State, as shown by records of 116 stations, was 3.81 inches, which is 0.61 of an inch above normal. The averages by sections were as follows: Northern section, 3.94 inches; central section, 3.46 inches; southern section, 4.09 inches. The largest amount reported was 8.79 inches, at Larrabee; least amount reported, 1.42 inches, at Waukee. The greatest daily rainfall was 4.09 inches at Larrabee, on the 11th and 12th. Average number of days on which .01 of an inch or more was reported, 10. Prevailing direction of the wind, south; highest velocity reported, 42 miles per hour, from the northwest, at Sioux City, on the 26th. Average number of clear days, 14; partly cloudy, 6; cloudy, 10.

October.—The monthly mean temperature for the State, as shown by records of 105 stations, was 52.2°, which is 0.3° above normal. By sections the mean temperatures were as follows: Northern section, 50.7°; central section, 52.1°; southern section, 53.8°. The highest monthly mean was 57.7°, at Belknap; lowest monthly mean, 47.2°, at Belle Plaine. The highest temperature reported was 90°, at Chariton, on the 3d; lowest temperature reported, 16°, at Earlham, on the 27th. The average monthly maximum was 80.4°; average monthly minimum, 25.4°. Greatest daily range, 57°, at Carroll; average of greatest ranges, 39.7°. Average precipitation for the State, as shown by records of 115 stations, was 1.95 inches, which is 0.49 of an inch below normal. The averages by sections were as follows: Northern section, 2.12 inches; central section, 1.78 inches; southern section, 1.95 inches. The largest amount reported was 4.50 inches, at Harlan; least amount reported, 0.32 of an inch, at St. Charles. The greatest daily rainfall reported was 2.90 inches, at Ruthven on the 6th. Average number of days on which 0.1 of an inch or more was reported, 5. Prevailing direction of the wind, south; highest velocity reported, 58 miles per hour, from the west, at Sioux City, on the 7th. Average number of clear days, 19; partly cloudy, 6; cloudy, 6.

November.—The monthly mean temperature for the State, as shown by records of 105 stations, was 34.2, which is 0.1 below normal. By sections the mean temperatures were as follows: Northern section, 32.2°; central section, 34.0°; southern section, 36.3°. The highest monthly mean was 39.0°, at Osceola and Red Oak; lowest monthly mean, 30.0°, at Estherville. The highest temperature reported was 76°, at Pacific Junction, on the 1st; lowest temperature reported, 5° below zero, at Carroll and Audubon, on the 18th and 26th. The average monthly maximum was 68.3°; average monthly minimum, 3.1°. Greatest daily range, 43°, at Osceola; average of greatest daily ranges, 30.9°. Average precipitation for the State, as shown by records of 116 stations, was 0.52 of an inch, which is 0.85 of an inch below normal. The averages of sections were as follows: Northern section, 0.17 inch; central section, 0.57 inch; southern section, 0.82 inch. The largest amount reported was 1.74 inches, at Allerton; least amount reported, trace, at Algona, Charles City, Forest City, Mason City, Northwood and Whitten. The greatest daily rainfall reported was 1.38 inches, at Washington, on the 10th and 11th. Average number of days on which .01 of an inch or more was reported, 3. Prevailing direction of the wind, northwest; highest velocity reported, 43 miles per hour, from the northwest, at Sioux City, on the 9th. Average number of clear days, 13; partly cloudy, 8; cloudy, 9.

December.—The monthly mean temperature for the State, as shown by records of 103 stations, was 19.6°, which is 3.9° below normal. By sections the mean temperatures were as follows: Northern section, 16.0°; central section, 19.7°; southern section, 23.0°. The highest monthly mean was 26.2°, at Glenwood; lowest monthly mean, 12.5°, at Sibley. The highest temperature reported was 58°, at Hopeville, Mount Ayr, Osceola and St. Charles, on the 31st; lowest temperature reported, 27°, at Sibley, on the 15th. The average monthly maximum was 48.8°; average monthly minimum, 15.3°. Greatest daily range, 56°, at Whitten; average of greatest daily ranges, 40.5°. Average precipitation for the State, as shown by records of 118 stations, was 0.41 of an inch, which is 0.88 of an inch below normal. The averages by sections were as follows: Northern section, .49 of an inch; central section, .37 of an inch; southern section, 38 inches. The largest amount reported was 1.96 inches, at Ridgeway; least amount reported, trace, at Storm Lake. The greatest daily rainfall reported was .68 of an inch, at Ridgeway, on the 25th.

Average number of days on which .01 of an inch or more was reported, 4. Prevailing direction of the wind, northwest; highest velocity reported, 50 miles per hour, from the northwest, at Sioux City, on the 28th. Average number of clear days, 11; partly cloudy, 9; cloudy, 11.

CLIMATE AND CROP REVIEW.

COMPARATIVE DATA OF THREE ABNORMAL SEASONS, AND SUMMARY OF 1903.

The first three crop seasons of the new century—1901-1902-1903—may be classed as radically abnormal in respect to seasonal rainfall and temperatures, their records serving as striking illustrations of possible climatic extremes of this section. The season of 1901 was notable for extreme heat and aridity of air and earth, breaking all records of daily averages and maximum temperatures in the midsummer period. The droughty conditions continued until about May 1, 1902; then came heavy downpours, with streams bankfull and overflowing, and continued excess of precipitation for a period of about seventeen consecutive months, or until September 15, 1903. For reference and comparison the following table is appended, showing the average precipitation and mean temperatures for the State, for the six crop months—April 1st to September 30th—in the last three years; also the monthly normals for the same period.

PRECIPITATION, INCHES.

Months.	1903	1902	1901	Normal
April	2.98	1.71	1.79	2.89
May	8.55	5.39	2.35	4.13
June	2.86	7.16	3.17	4.50
July	4.83	8.67	2.34	4.23
August	6.64	6.58	1.29	3.43
September	3.81	4.35	4.77	3.30
Total for six months	29.67	33.86	16.25	22.48
Total for the year	35.39	43.82	24.41	31.42

MEAN TEMPERATURE, DEGREES.

April	49.8	48.2	49.9	49.3
May	61.6	63.8	60.7	60.4
June	64.6	65.2	72.3	69.6
July	72.9	73.1	82.4	74.2
August	69.1	69.1	73.8	71.8
September	60.8	59.1	63.3	63.6
Means	63.1	63.0	67.0	64.8

The records of the four critical crop months—May 1st to September 1st—show the marked difference in the rainfall and temperature of 1901 in comparison with the two following seasons. The total amounts for the four months were as follows: In 1901, 9.69 inches; in 1902, 27.80 inches; in 1903, 22.88 inches. The normal for the four months is 16.29

inches. The most favorable showing in these records is the fact that the rainfall in the crop season of 1903 was nearly 5.00 inches less than in the same period in 1902, indicating a return towards normal conditions.

The winter of 1903 was generally about normal and favorable for live stock and the usual farm operations of the season. The soil was very wet, and the ponds and streams were more than usually filled with water and ice. Fall wheat and rye wintered fairly well, though the covering of snow was generally light. March was warmer than usual, with somewhat less than the normal precipitation; but the excessive cloudiness and humidity retarded farm work except in dry, sandy soil. While the spring opened earlier than usual, the fields were too wet to allow an early start in farm work.

April was about normal in temperature and rainfall, but the prevalence of cloudy, misty and humid weather during the larger part of the month retarded the necessary drying of the surface. The usual farm operations were pursued under these adverse conditions, causing material reduction of the acreage of spring wheat, oats and barley. Pastures and meadows made an early start and the grain crops germinated readily making a fairly good stand. A snowstorm with freezing temperature at the close of the month checked crop growth and injured the earlier varieties of apples cherries and plums.

May was the wettest and most unfavorable month of the season. The soil at the outset was supersaturated and the average rainfall for the State for the month was 8.55 inches. The distribution of this excessive amount of rainfall was variable ranging at local stations from 2.88 to 15.45 inches; but the averages of each station was above 8 inches. The best conditions as to dryness of soil were in the Mississippi river districts. The great interior basins of the Des Moines, Iowa and Cedar rivers were subjected to very heavy floods about the close of the month, causing much delay in farming operations and damage to all crops. From about the 3d to the 18th conditions were at their best, and during that part of the month the plowing, planting and other farm operations were in progress on the drier lands, with only occasional interruption by showers. Most of the corn that was planted was put in during that period. The protracted and very heavy storms during the last decade rendered field work impracticable in more than four fifths of the State. At the close of the month not more than two thirds of the usual corn area had been planted. The germination was generally quick and satisfactory in the stand, but the fields soon became very foul from the lack of cultivation, and much more than the usual amount of replanting was necessitated as a result of washing and flooding the fields. The general condition of wheat, oats, rye, barley and meadows was better than seemed to be possible during prevalence of the storms.

June was unseasonably cool, but generally dry and more favorable for field work and crops than the preceding month. The mean temperature was about 5° below normal, and the rainfall was 1.52 inches below the average. The surface dried off slowly, and the cool weather was more favorable for small grain than for the rapid germination and growth of the belated corn. Good progress was made in replanting the washed out corn fields and in cultivating the early planted corn on the dry upland. Seasonable temperature about the close of the month caused a marked improvement in the appearance and prospects of this important staple and in size and color it was much nearer the normal condition than was deemed possible at the outset. Clover-cutting was begun near the middle of the month and haymaking was quite general at the close, the output being above the average.

July was characterized by frequent and sudden alternations from high to low temperatures. The daily mean for the month was about 2° below normal the first decade being unusually warm the second decade unseasonably cool and the third decade bringing the two extremes of temperature. The average rainfall for the State, 4.83 inches, was .91 of an inch above the July normal. The distribution was very unequal, the average of the northern section being 6.49, the central section 5.28, and the southern section 2.73 inches. The heaviest amounts of rainfall were reported at stations in the northeast district. The most destructive storm of the month occurred on the afternoon of the 20th, sweeping across the state on a direct line from Lyon and Osceola southward to Adams, Taylor and Ringgold its pathway varying in width from one to eight miles. At numerous points along this line the storm was accompanied by high winds and very heavy hail, causing almost total loss of growing crops within an area of more than three hundred square miles. In portions of the southern section droughty conditions prevailed for many days, causing some detriment to growing crops; but the closing week brought generous showers. On the whole the month was favorable to haymaking and harvesting of wheat, oats, barley and rye. The hay crop proved to be one of the best ever produced in the State, and the greater part of it was secured in excellent condition. Wheat and oats were generally harvested in good condition, but on account of the rust and blight the yield has been disappointing, though the quality of the grain will be greatly superior to the output of last year. The corn crop made fairly good progress during the month, though the temperature was somewhat unfavorable about half of the time. The early planted portion of the crop reached the earing stage while the late planted corn was generally small and unpromising. The outlook for the crop as a whole was not encouraging at the close of July.

August was cooler than usual, with a large excess of rainfall, humidity and cloudiness. The mean temperature was 3.1° below normal, and the average rainfall, 6.64 inches, was 3.43 inches above normal. The southern section received the larger amount, an average of 8.74 inches, the bulk of it falling in the last week of the month (State Fair week). It was the wettest August of which we have records for the State. There were nineteen cloudy or partly cloudy days. During the fair weather periods considerable progress was made in threshing and other farm operations. Haymaking was continued throughout the month, when the weather permitted, securing a large amount of aftermath, wild hay, and second crop of clover for seed and fodder. More than the usual amount of plowing was done. with generally favorable conditions of soil for this work. Threshing returns indicated generally light and unsatisfactory yield of wheat. oats and barley; the yield of timothy seed has been unusually heavy. The development of the corn crop was all that could be expected under the prevalent weather conditions. At the close of the month the early planted corn, about forty per cent of the whole area, had reached the roasting ear stage. or a little beyond. giving promise of reaching maturity within twenty days. under favorable conditions. The balance of the crop was in various stages of growth. indicating need of very good ripening weather for a full month or more to place the bulk of it beyond danger of harm or frost. The outlook for the crop as a whole was at that time unsatisfactry. The late potato crop made fair growth in dry and sandy soil. but there were reports of damage by rot in many localities. The crop of early and fall apples gave good returns, especially in the northern half of the State; but winter apples were unpromising. Pasturage made a heavy growth. giving assurance of abundant fall feed for stock.

September was cooler than usual. the mean temperature being 3.4 below normal. Frosts occurred at numerous stations on the 16th. 17th. 18th. 24th and 27th, but little damage resulted to corn and other crops. except in limited areas on low ground. The main detriment caused by the cold and frosty period was the delay in bringing belated corn to full maturity. The period of most unfavorable weather and heaviest rainfall was from the 4th to the 16th. In the last half of the month there were about twelve days of ideal weather for maturing crops, harvesting. threshing and plowing. During this time corn made very good progress, and at the close of the month fully 80 per cent of the crop was well matured. the balance requiring two weeks of frostless weather and generally favorable conditions to make it safe. There was but little expectation of bringing all of the belated portion of the crop to maturity. as some of it was green and soft at the close of September. A considerable amount of the early corn was cut and put into shock after the first appearance of frost. Fall pasturage was never better, and seldom as good at this time of year. Fair progress was made in harvesting the minor crops, and a good deal of second crop hay was secured. Fall plowing was well advanced. much more than the usual acreage having been done with the soil in excellent condition. The potato harvest showed a very light yield, and much damaged by rotting. The fall apple crop was fair, but winter apples were inferior in size and quality. On the whole September was a fairly satisfactory month, though below in temperature and sunshine. The adverse features of the month were the natural sequence of the preceding abnormal spring and summer.

October was an ideal autumn month. The mean temperature was slightly above and the rainfall below the normal. and the percentage of sunshine was higher than usual. The bulk of the rainfall came in the first seven days, and generally with but little disturbance of the elements. No trace of snow was reported during the month. The first general killing frost occurred on the 18th. at which time there was practically very little of value exposed to damage by freezing temperature. The greater portion of the late planted corn was fairly well matured before the middle of the month. Reports were received of very many fields planted as late as June 15th which were well ripened by October 10th. The amount of fall plowing in the State at large was much greater than in recent years. A limited acreage of fall wheat and rye was sown, and the conditions were favorable for germination and growth, insuring a good stand. The fall pasturage was never better, being very green and succulent at the close of October. The dry weather was favorable to harvesting potatoes, apples, and all the late maturing crops. The potato crop was generally light, with considerable damage by rot, though some localities report a fair yield. The yield of winter apples was much below the average. Forage crops and garden truck made excellent yields. As a whole October was a remarkably fine month, making an exceptional record in view of the adverse weather conditions of the preceding months.

November was unusually dry and seasonably warm, with less than the average amount of atmospheric disturbance. Conditions were favorable for farm operations, and excellent progress was made in cribbing the corn crop. The cobs contained more than the usual amount of moisture, but the dry weather and freezing temperature prevented damage by heating in the cribs. The small acreage of fall wheat and rye suffered no material injury from dry weather and freezing. The weather was highly favorable for stock feeding and pastures afforded good feed throughout the month. The supply of water for stock was ample for the winter.

On the whole the crop season of 1903 was materially better than the preceding season, the quality of the output of the soil being much superior. The forage crops have been exceptionally heavy, and the fall months were favorable for securing the full benefit of the abundant yield of pasturage and fodder. There is much cause for congratulation and thankfulness that, under such unusual conditions, the yield of all staple crops has been sufficient to afford a liberal reward for the labor of the tillers of the soil of this most fertile State.

CROP REPORT, JUNE 1, 1903.

Reports of the regular crop correspondents of the Iowa Weather and Crop Service, made June 1st, have been received and tabulated for the State at large. The showing as to the acreage, as compared with last year is somewhat better than we had reason to expect in view of the adverse weather conditions and saturated state of the soil in the seeding and planting season. The county reports were generally mailed about the 27th to 30th of June, when the conditions were at their worst for the formation of a fair estimate as to the status of the crops.

The percentage of the acreage of the staples are as follows, the figure 100 representing the area of last year:

Winter wheat, 83 per cent; spring wheat, 85; oats, 92; barley, 90; rye, 88; meadows, 101; potatoes, 94; flax, 87.

Conditions of Crops and Fruit.—Winter wheat, 96; spring wheat, 93; corn already planted, 75; oats, 93; barley, 96; rye, 94; meadows, 109; pastures, 107; flax, 84; potatoes, 91; apples, 70; plums, 35; peaches, 40; cherries, 35; grapes, 70; strawberries, 90; blackberries, 92; raspberries, 85.

Live Stock.—Cattle, 99; sheep, 99; hogs, 98; spring pigs, 89; horses, 96; foals, 95.

Last year at corresponding date conditions were rated as follows: Corn, 97 per cent; wheat, 99; oats, 98; barley, 100; rye, 99; flax, 98; potatoes, 103; meadows, 96; apples, 70; plums, 72; cherries 70; grapes, 72; strawberries, 80; raspberries, 71; blackberries, 67.

CROP REPORT, JULY 1, 1903.

Reports from county and township crop reporters for July 1st have been tabulated, showing the following percentages of condition: Spring wheat, 88 per cent; corn, 77; oats, 87; barley, 89; rye, 98; flax, 85; meadows, 104; pastures, 107; potatoes, 96; apples, 70; plums, 49; grapes, 78.

Last year at corresponding date the percentages were as follows: Wheat, 97; corn, 92; oats, 95; rye, 98; barley, 97; flax, 99; potatoes, 108; meadows, 99; pastures, 107; apples, 65; grapes, 65.

A revised estimate of the area of corn planted this year shows 87 per cent, or an average decrease of 13 per cent, compared with the area planted in 1902.

CROP REPORT, AUGUST 1, 1903.

Reports from township and county crop correspondents of the Iowa Weather and Crop Service have been tabulated, showing the following estimates of the condition of the staple crops on August 1, 1903: Spring wheat, 82 per cent; corn, 73; oats, 77; millet, 96; flax, 8[illegible]; buckwheat, 89; pastures, 104; sorghum, 84; potatoes, 80; apples, 65; grapes, 80.

At corresponding date last year the estimates were as follows: Spring wheat, 84; corn, 93; oats, 83; flax, 91; potatoes, 107; apples, 66.

IOWA CROPS—FINAL RFPORT, 1903.

AVERAGE YIELD PER ACRE; TOTALS FOR THE STATE; CURRENT FARM PRICES, DECEMBER 1, 1903.

Following is a summary of crop reports from correspondents of the Iowa Weather and Crop Service, showing the average yield per acre and totals of staple soil products, and the average prices at the farms or nearest stations December 1, 1903. In this showing of the value of the season's output of grain, forage, etc., no reckoning is made of the increment in value gained by consumption of soil products on the farms in the production of beef, pork, mutton, horses, butter, poultry, eggs, etc. Usually the prices obtainable for the crops at the close of the season do not express more than two thirds of the actual value of the staple products of the soil.

The Corn Crop.—In estimating the output of this crop the most difficult problem is to determine the extent of loss of acreage caused by floods and adverse weather conditions in the season of planting and cultivating. As a result of inquiry and careful computation it appears that the corn area actually cultivated and harvested this season is approximately 7,398,320 acres. The returns of township assessors show that the area planted in 1902 was 8,925,068 acres, and by comparison it is shown that the reduction this season amounted to about 1,526,748 acres. The average yield per acre for the State this year was 31 bushels, and the aggregate product is estimated at 230,511,310 bushels. The average farm price on December 1st was 36 cents per bushel, making the aggregate value $82,984,071. Last year the product was much inferior in quality though much larger in amount, and the value was computed at $83,000,000. The yearly average for thirteen years has been $69,633,000.

In respect to quality of the grain and actual commercial value, the corn crop of this season is fully 20 per cent better than the output of 1902.

Wheat.—Winter wheat acreage harvested 84,934 acres; yield per acre, 16.9 bushels; total yield, 1,435,380 bushels; average price 70 cents per bushel; total value, $1.004,766. Spring wheat area harvested, 752,488 acres; average yield 12.6 bushels per acre; total product, 9,481,350 bushels; price per bushel, 65 cents; total value, $6,162,877. Aggregate value of wheat, $7,167,643. Last year the value was $7,062,640. Average yearly value for past thirteen years, $10,524,000.

Oats.—The oats crop this season has been below the average in yield per acre and weight per bushel, as a result of adverse conditions. The area harvested was 3,822,882 acres; average yield, 25.9 bushels per acre; total product, 99,012,660 bushels; aggregate value, at 30 cents per bushel, $29,703,798. Last season the product was 92.907.000 bushels, valued at $22,907. The average yearly output for thirteen years has been 117,118,000 bushels, and the value $25.420,000.

Barley.—Area harvested, 493.108 acres; yield per acre, 24.7 bushels; total product, 12,179.790 bushels; average price, 37 cents per bushel; total value, $4.506,522. The yield and value are about the thirteen-year average.

Rye.—Area harvested, 123,273 acres; average yield, 15.6 bushels per acre; total product, 1,923,060 bushels; current price, 44 cents per bushel; total value, $846,146.

Flax.—Area harvested, 40,823 acres; yield per acre, 8.7 bushels; total yield, 355,160 bushels; current farm price, 78 cents per bushel; total value, $277,024.

Potatoes.—Area harvested, 113.433 acres; average yield, 5.38 bushels per acre; total product, 6.082,694 bushels; average farm price, 75 cents per bushel; value of product, $4.562,020. The total yield is about half the thirteen-year average; total value about the average of the thirteen-year period.

Hay.—(Tame). Average yield per acre, 1.9 tons; total product, 5,216.404 tons; current farm price, $5.75 per ton; total value of crop, $29,994,323.

Hay.—(Wild). Yield per acre, 1.3 tons; total product, 1,191,345 tons; average price, $4.95 per ton; total value, $5,897,157. The hay crop as a whole (tame and wild) is nearly 900,000 tons in excess of the thirteen-year average.

Pasturage.—This most important soil product has been at its best in the recent wet seasons, when the cereal crops have suffered much detriment from excessive moisture. It is not measurable by the ton or bushel, and its value can only be estimated approximately by considering it as the basis of stock growing and dairying. From this point of view it will be a conservative estimate to figure the output of pastures and all other grazing lands at an average of $300 per farm. This makes a total value of $68,000,000 for the State.

Corn fodder in shock and fields is worth at least $10,000,000. Sorghum broom corn and sweet potatoes are worth about $750,000.

TABULATED CROP SUMMARY.

Crops.	Total Products.	Farm Values December 1.
Corn	230,511,310 bus.	$ 82,984,071
Wheat	10,916 730 bus.	7,167,643
Oats	99,012,660 bus.	29,703,798
Barley.	12,179,790 bus.	4,506,522
Rye	1,923,060 bus.	846,146
Flax	355,160 bus.	277,024
Potatoes.	6,082,694 bus.	4,562,020
Hay (tame)	5.216,404 tons.	29,994,323
Hay (wild)	1,191,345 tons.	5,897,157
Pasturage (estimated)		68,000,000
Timothy and clover seed		1,225,000
Corn fodder.		10,000,000
Sorghum, broom corn and sweet potatoes		750,000
Fruits and vegetables		10,500,000
Total value		$ 256,413,704

Iowa Farm Scene.—Home of R. T. St. John, Mitchell county.

FINAL CROP REPORT, 1903.

AVERAGE PER ACRE AND TOTAL YIELD BY COUNTIES.

Counties.	Corn.		Winter Wheat.		Spring Wheat.		Oats.		Rye.		Barley.		Flax.		Potatoes.		Hay (tame).		Hay (wild).	
	Bushels per acre.	Total bushels.	Bushels per acre.	Total bushels.	Bushels per acre.	Total bushels.	Bushels per acre.	Total bushels.	Bushels per acre.	Total bushels.	Bushels per acre.	Total bushels.	Bushels per acre.	Total bushels.	Bushels per acre.	Total bushels.	Tons per acre.	Total tons.	Tons per acre.	Total tons.
Adair	25	2,299,400	8	2,720	12	118,200	25	741,250	15	3,900	24	14,210	....	....	38	44,460	1.5	72,430	1.2	3,210
Adams	25	1,605,000	20	25,220	11	35,320	21	268,170	20	10,860	20	20,400	....	....	40	30,560	1.8	52,500	1.0	1,560
Allamakee	40	1,641,200	15	15,600	12	38,320	30	1,388,300	10	14,200	30	209,760	8	3,240	40	43,680	2.0	78,520	1.0	2,310
Appanoose	25	1,160,250	15	23,250	....	....	27	263,950	10	23,910	....	....	....	....	25	23,300	1.7	71,740	2.0	1,640
Audubon	30	2,141,100	16	640	12	235,320	22	703,340	18	2,970	25	56,100	....	....	45	41,710	2.0	51,860	2.0	8,460
Benton	32	3,682,810	....	....	15	25,720	30	1,939,350	12	10,080	25	339,600	...	.	60	107,340	1.5	58,740	1.0	7,920
Black Hawk	34	2,752,200	20	940	12	5,760	28	1,502,480	16	27,840	29	107,010	....	....	80	110,640	1.9	58,050	1.6	18,990
Boone	26	2,081,110	....	....	11	34,310	24	1,100,640	11	5,412	20	5,400	....	.....	45	49,000	2.0	49,900	1.5	24,300
Bremer	25	1,351,420		....	12	5,040	24	1,229,520	20	27,700	24	36,680	....	.....	62	82,460	1.8	31,050	1.2	18,720
Buchanan	40	2,439,200	....	....	15	7,680	25	1,326,870	18	12,610	25	33,000	....	.....	80	76,320	2.0	71,680	1.5	18,550
Buena Vista	33	2,699,080	....	....	15	54,660	24	1,255,680	16	6,720	22	68,640	..	....	60	78,640	2.0	37,20	1.5	24,000
Butler	28	2,514,540	...	.....	12	4,830	25	1,819,000	13	22,100	20	16,400		.	80	100,320	1.9	33,420	1.5	19,420
Calhoun	20	1,312,140	...	....	9	40,410	23	1,391,310	10	2,790	21	80,010	....	....	30	25,200	2.0	32,840	1.4	16,250
Carroll	40	2,950,720	.	....	12	193,600	25	1,363,620	18	4,680	20	65,420	....	....	50	85,050	2.0	42,360	2.0	30,740
Cass	28	2,831,360	...	....	14	269,080	25	755,250	29	9,120	22	23,760	....	....	44	69,750	1.8	62,260	1.5	4,110
Cedar	41	3,805,210	22	18,260	16	21,120	32	1,095,680	17	30,460	30	365,300	....	.	80	89,280	2.5	97,950	1.5	1,240
Cerro Gordo	31	2,302,060	....	....	11	10,560	28	1,836,520	16	8,128	25	52,250	6	10,460	80	104,800	1.8	41,770	1.3	14,180
Cherokee	38	3,370,220		....	11	240,790	31	1,494,510	15	1,650	26	135,460	....	......	40	49,600	2.0	40,090	1.5	19,590
Chickasaw	27	1,558,170		....	15	15,150	26	1,780,640	15	11,670	24	68,120	13	66,430	72	87,264	1.9	46,380	1.5	16,270
Clarke	21	1,010,520	20	9,600	....	....	21	332,910	15	7,690	...	......	.	....	45	21,010	1.6	72.430	1.0	610
Clay	24	1,677,360		....	10	62,300	25	1,290,250	15	15,300	22	351,730	8	13,640	52	41,020	1.5	28,630	1.4	29,270
Clayton	41	2,929,450	16	28,416	13	75,730	28	1,831,760	16	80,720	30	186,600	....	.	82	63,960	2.0	91,620	1.5	4,980
Clinton	35	3,073,100	18	9,450	12	32,480	24	817,040	15	48,150	22	113,410	....	......	70	81,970	2.0	88,640	1.5	6,310
Crawford	33	3,484,470	....	....	10	424,270	25	952,750	14	9,870	20	56,360		....	50	98,556	2.0	65,020	1.3	12,240
Dallas	35	3,157,700	20	38,080	14	53,760	30	1,094,280	20	15,200	30	25,200	....	....	50	43,750	2.0	49,390	1.5	14,130
Davis	25	1,028,050	13	23,530	....	....	23	350,060	10	24,480	..	....	....	....	30	19,500	1.8	74,020	1.0	160
Decatur	24	1,427,280	16	24,690	....	.....	25	398,500	12	8,940	....	......	....	....	40	46,080	1.6	86,970	1.0	670
Delaware	32	2,645,760	20	1,220	16	20,960	28	1,352,540	20	38,200	33	168,960	....	....	50	58,150	1.6	60,370	1.0	7,910
Des Moines	22	938,520	18	63,180	15	7,200	26	653,120	16	15,680	....	....		....	58	46,790	1.8	35,800	1.0	590
Dickinson	25	916,250	....	...	10	52,500	22	581,680	12	4,200	20	362,600	10	14,600	45	22,950	1.8	13,960	1.5	22,140
Dubuque	42	2,563,260	15	2,370	15	55,590	24	1,256,400	20	41,920	33	83,820	....	....	60	115,200	2.0	91,650	1.4	3,940
Emmet	33	1,348,710	....	....	12	31,680	33	1,14[illegible],800	10	2,730	30	246,300	10	14,760	58	23,890	2.2	23,910	1.8	20,770
Fayette	35	2,895,200	18	3,240	12	36,360	25	1,660,250	20	23,200	30	152,700	9	17,820	70	114,000	2.0	97,240	1.5	10,780
Floyd	28	2,069,760	....	....	12	5,240	26	1,6[illegible]6,700	17	23,290	31	119,040	8	20,080	45	85,050	1.8	31,950	1.4	10,220
Franklin	33	2,887,830	....	....	12	21,720	29	1,998,390	12	10,080	25	25,550	...	...	50	51,450	2.0	40,260	1.0	17,190

FINAL CROP REPORT, 1903—CONTINUED.

Counties.	Corn.		Winter Wheat.		Spring Wheat.		Oats.		Rye.		Barley.		Flax.		Potatoes.		Hay (tame).		Hay (wild).	
	Bushels per acre	Total bushels.	Bushels per acre.	Total bushels.	Bushels per acre.	Total bushels.	Bushels per acre.	Total bushels.	Bushels per acre.	Total bushels.	Bushels per acre.	Total bushels	Bushels per acre.	Total bushels.	Bushels per acre.	Total bushels	Tons per acre.	Total tons.	Tons per acre.	Total tons.
Fremont	30	3,116,100	12	90,480	11	22,770	25	222,550	20	10,820	....	....	..	.....	60	38,400	2.0	28,170	1.0	5,710
Greene	20	1,355,700	....	....	12	27,720	22	867,240	12	1,800	24	53,040	....	....	51	32,380	2.0	36,410	1.2	14,520
Grundy	40	3,428,560	...	....	12	27,780	25	1,565,720	5	1,870	22	233,080	.	......	70	106,750	2.0	43,480	1.0	8,100
Guthrie	28	2,231,440	20	8,800	13	122,330	26	900,920	20	4,940	30	31,200	....	....	52	28,080	2.2	62,890	1.3	9,210
Hamilton	25	1,564,500	..	....	12	37,080	22	1,047,420	14	980	20	15,600	7	5,740	53	69,960	1.8	32,400	1.5	33,150
Hancock	30	1,567,800	....	....	13	61,490	25	1,837,000	20	5,800	24	62,640	9	12,780	40	36,480	1.5	26,110	1.5	28,510
Hardin	31	2,706,610	....	...	11	49,610	27	1,402,110	16	3,680	21	15,330	....	......	62	87,180	1.8	37,130	1.5	22,140
Harrison	35	3,653,650	15	4,350	12	367,680	25	383,750	15	18,330	35	31,830	....	......	65	90,450	2.2	26,750	1.5	19,920
Henry	30	1,737,000	15	32,400	12	840	25	563,000	15	67,800	22	40,370	...	.....	70	35,420	2.0	44,250	1.0	140
Howard	25	1,146,250	....	....	15	10,120	30	1,694,400	18	2,340	28	161,640	10	61,800	48	44,100	1.8	53,280	1.2	14,010
Humboldt	36	1,554,840	....	....	12	53,100	32	1,200,640	16	2,240	30	60,900	10	11,220	80	35,640	2.4	35,400	1.5	21,340
Ida	28	2,555,020	..	......	10	189,860	23	792,350	15	5,400	22	97,460	....	.....	40	36,880	2.0	41,420	1.2	5,410
Iowa	39	2,678,910	30	7,800	19	25,080	30	1,029,600	20	13,800	28	122,920	....	....	70	86,100	2.2	97,370	2.0	2,100
Jackson	33	2,337,720	17	6,630	15	61,560	22	787,380	18	60,100	30	104,200	....	....	75	87,000	1.8	77,390	1.5	6,070
Jasper	35	3,664,150	15	16,200	13	99,600	27	1,168,850	26	19,980	30	....		......	58	118,610	1.8	62,570	1.2	2,410
Jefferson	31	1,465,990	14	34,440	12	840	27	511,920	16	93,280	20	46,120	....	.....	65	31,850	1.7	51,612	...	.....
Johnson	38	3,421,520	15	12,300	14	17,220	27	1,081,620	15	52,020	28	176,120	....	....	71	91,590	2.0	87,260	1.5	2,380
Jones	35	2,696,400	....	....	12	15,300	26	901,300	16	33,320	30	186,600	....	....	70	59,570	2.0	90,420	1.5	1,500
Keokuk	28	2,383,080	14	22,540	12	9,840	25	785,500	18	57,780	24	79,440	....	....	55	46,750	1.5	59,800	1.0	370
Kossuth	22	2,464,220	....	......	15	197,380	24	1,591,380	15	3,500	25	139,250	9	28,980	35	55,780	1.5	34,600	1.0	53,670
Lee	30	1,530,900	15	109,650	....	......	21	439,340	15	90,090	20	2,420	....	....	50	58,050	1.6	60,300	1.0	210
Linn	32	2,793,920	18	1,800	12	25,320	30	1,413,900	16	23,[illegible]70	25	23,570	.	......	65	99,480	1.5	60,430	1.0	5,210
Louisa	28	1,335,320	15	45,600	13	910	28	617,080	15	60,450	20	18,860	....	.	58	28,520	2.0	32,670	1.5	7[illegible]0
Lucas	27	1,193,930	20	25,400	...	....	30	412,800	14	25,760	....	....	....	.....	25	12,250	1.5	63,550	1.0	550
Lyon	28	1,975,120	....	......	11	379,390	27	1,295,190	15	2,550	25	1,063,000	7	1,540	58	70,180	2.0	16,720	1.5	20,070
Madison	35	2,486,750	15	21,150	12	43,680	27	510,03	20	13,800	30	51,600	....	...	45	27,690	2.0	77,020	1.5	4,470
Mahaska	32	3,020,150	15	24,750	12	20,520	30	952,500	15	31,560	25	70,250	....	.....	40	35,600	2.0	61,880	1.0	940
Marion	31	2,706,920	15	46,200	12	44,120	20	569,600	16	31,040	22	20,240		....	58	48,720	2.0	51,220	1.0	1,190
Marshall	42	4,178,160	...	.....	15	98,750	24	1,294,080	20	1[illegible],020	25	64,350	...	...	58	66,120	1.8	50,580	1.0	2,200
Mills	31	2,179,610	17	36,720	10	71,200	23	264,100	16	8,480	20	8,400	...	......	45	38,250	1.8	29,510	1.2	4,910
Mitchell	25	1,379,250	...	....	10	23,000	23	1,399,320	11	8,540	25	324,000	8	38,120	22	27,060	1.5	36,780	1.0	3,290
Monona	32	2,882,240	20	18,400	11	646,200	30	541,920	10	11,070	25	132,250	...	.....	50	60,500	2.0	8,6[illegible]0	1.5	[illegible]2,840
Monroe	25	1,175,250	12	3,840	12	1,320	28	284,640	11	10,450	20	6,400	....	....	40	22,400	2.0	61,700	1.0	420
Montgomery	32	2,738,560	13	30,230	12	128,510	25	348,000	15	7,400	20	6,600	...	....	50	34,500	2.0	64,880	1.0	1,510
Muscatine	35	2,398,600	20	49,800	15	23,100	28	602,500	18	96,380	23	149,730	...	....	65	130,650	2.2	52,820	1.0	3,070
O'Brien	30	2,420,800	....	....	15	267,150	30	1,672,200	15	4,200	20	522,600	8	3,040	50	61,150	2.0	35,620	1.5	20,370
Osceola	21	844,620	...	....	8	97,680	20	662,600	18	2,160	17	494,870	6	4,690	32	20,160	1.7	18,130	1.5	12,420

Page	28	2,886,520	18	164,750	13	65,540	22	269,940	20	26,200	25	28,000	....	....	70	62,370	1.8	34,890	1.5	4,680
Palo Alto	28	1,726,720	....	....	11	30,470	26	1,187,680	10	3,500	28	173,740	7	23,120	40	32,360	1.7	16,670	1.0	31,960
Plymouth	33	3,597,660	....	....	12	858,360	25	1,028,000	15	7,350	22	225,060	8	1,680	50	96,250	2.0	35,840	1.0	27,910
Pocahontas	30	2,903,500	....	....	12	25,720	25	1,053,000	20	9,440	22	68,420	8	20,960	40	43,560	1.8	21,920	1.2	38,650
Polk	38	3,794,900	16	20,360	15	61,650	31	1,107,940	18	14,760	20	2,620	.	....	55	108,680	2.0	43,670	1.8	17,850
Pottawattamie	32	5,735,360	12	12,120	12	469,320	23	690,230	16	12,960	22	221,010	....	....	48	117,120	2.0	67,080	1.5	19,660
Poweshiek	35	3,169,460	15	1.300	13	34,190	26	1,003,860	16	8,960	30	130,260	....	....	72	76,320	2.1	91,490	1.2	770
Ringgold	25	1,730,600	14	13,020	10	130	23	490,360	12	10,080	25	4,520	....	....	30	13,590	2.2	53,960	1.4	890
Sac	36	3,432,600	....	....	13	118,820	31	1,617,580	20	5,800	28	145,880	11	1,210	70	71,750	1.9	47,530	1.3	15,880
Scott	41	3,005,710	21	46,620	16	115,440	25	559,970	17	37,500	25	714,600	...	....	85	364,650	2.0	53,580	1.5	6,930
Shelby	30	3,218,700	....	....	13	415,870	22	591,140	16	5,920	21	133,770		....	50	65,300	2.0	55,860	1.5	12,910
Sioux	33	4.033,480	....	....	12	756,720	28	1,422,680	15	1,620	26	876,660	10	4,200	42	58,880	1.7	18,156	1.6	37,120
Story	30	2,652,300	22	3,520	14	21,940	26	1,363,180	18	8,820	23	11,730		....	60	48,840	2.0	44,980	1.5	22,360
Tama	34	2,962,080	....	.....	13	93,860	26	1,252,160	13	6,630	22	398,640	...	....	70	113,750	2.0	81,780	1.4	7,020
Taylor	28	1,615,600	15	70,810		...	22	355,740	13	13,780	19	20.330	..	.....	52	33,390	2.0	69,480	1.6	810
Union	25	1,223,080	18	2,880	12	1,320	22	409,600	16	4.320	21	8,610	....	....	52	41,860	2.8	85,426	1.2	1,290
Van Buren	28	1,123,080	16	44,160	....	......	22	260,260	12	54,060	....	....	....	....	50	20,750	1.8	65,440	1.5	45
Wapello	31	1,552,170	20	50,140	12	2,160	25	366,000	15	73,650	23	24,960	....	....	53	48,760	1.7	54,890	1.5	180
Warren	31	2,517,820	20	24,200	14	3,240	27	618,560	17	31,620	24	48,770	....	....	51	40,290	1.8	73,950	1.5	2,490
Washington	35	2,296,350	18	27,180	14	4,480	23	749,910	14	42,280	30	115,200	....	.....	70	48,370	2.0	52,430	1.0	180
Wayne	22	1,150,160	15	2,370	....	.....	30	447,120	12	13,320	....	......	....	......	43	17,630	1.8	107,540	1.5	330
Webster	25	2,263,500	....	.....	15	78,950	30	1,986,930	15	3,900	26	30,160	8	6,480	55	57,210	2.2	42,520	1.5	50,070
Winnebago	20	818,800	....	....	12	99,840	22	882,420	....	....	23	25,760	8	8,200	50	30,400	2.0	23,370	1.5	23,610
Winneshiek	33	2,098,860	18	1,980	13	92,570	25	1,756,300	19	6,840	26	268,060	10	72,130	30	35,280	1.8	85,670	1.5	9,020
Woodbury	35	2,366,230	18	10,080	12	516,120	30	914,220	13	10,530	30	222,360	9	2,250	45	65,250	2.0	2[illegible],860	1.5	22,780
Worth	32	1,157,440	....	......	12	48,120	31	990,140	15	2,550	30	54,990	11	63,910	45	33,300	2.0	33,520	1.5	15,640
Wright	25	1,861,000	....	....	15	62,700	24	1,388,640	15	2,620	24	39,120	8	12,080	40	29,280	2.0	38,440	1.6	29,100
Total for state	...	230,511,310	..	1,435,380	....	9,481,350	....	99,012,660	....	1,923,060	....	12,179,790	...	355,160	..	6,082,694	...	5,216,404	.....	1,191,345
Av. per acre	31	....	16.9	....	12.6	....	25.9	....	15.6	.....	24.7	.....	8.7	.....	53.8	....	1.9	.....	1.3	....

APPENDIX.

IOWA CLIMATE AND CROPS.

CLIMATIC DATA COMPILED FROM ALL AVAILABLE RECORDS, AND STATISTICS OF THE SOIL PRODUCTS OF THE STATE.

PREFATORY NOTES.

In response to a constantly increasing public demand for climatic data and statistics of farm products, the following pages have been appended to this report. In this age of intensive scientific investigation and far-reaching statistical inquiry the matter herein presented is of vital interest to students of climatology, producers and consumers of foodstuffs, and men of affairs who direct the operations of our complex industrial and commercial system.

Meteorological records have been made at stations of observation well distributed throughout the state, and cover sufficient periods of time to illustrate fairly the general characteristics and permanent conditions of the climate of Iowa, and the statistics of farm crops afford ample proof of the marvelous productivity of its soil. To answer questions being the special purpose of this compilation of data, the tables of climatic means and crop averages and totals have been placed in convenient form for reference and comparison.

In the systematic collection of climatic data the medical department of the United States army took the initiative in the early part of the last century. The surgeons or hospital stewards at all military posts were directed to keep a diary of the weather, and to note everything of importance relating to the climate. And the records made in pursuance of this general order afford all the accurate knowledge we have of the climate of the northwest in the years antedating the general settlement of the country. Observations were made and recorded at Council Bluffs military post in 1820-25; at Fort Armstrong (Rock Island), in 1824-35; at Fort Des Moines in 1843-46; at Fort Atkinson in 1844-46; and at Fort Dodge in 1851-53. These somewhat fragmentary records have a special value as evidence of the fact that the climate of this region has been practically permanent for more than three-quarters of the past century.

To the late Prof. Theodore S. Parvin belongs the honor of being the pioneer voluntary meteorological observer of this state. His service in that line was begun at Muscatine in January, 1839, and continued at that place until 1860. After his removal in the latter year to Iowa City to accept a professorship in the state university, his observations were resumed and continued until 1873, when the service was transferred to Dr. Gustavus Hinrichs, who began the organization of the Iowa weather service. The records made by Professor Parvin, covering a third of a century, were used by him in the preparation of articles on the climate of Iowa, contributed to various scientific publications, rendering valuable service by setting forth the climatic advantages of this then comparatively unknown and sparsely settled region. At Muscatine the observations were continued by the Rev. John Ufford and J. P. Walton, making a consecutive record of more than fifty years, of much public value.

In 1849 the Smithsonian Institution, aided by the general government, established stations of observation in all parts of the Union, wherever amateurs of science could be found to serve as voluntary observers. An issue of instruments was made to observers, and about twenty fairly well equipped stations were established in Iowa. The records of mean temperature and precipitation are to be found in the voluminous reports of that institution. The first attempt to predict the course of general storm movements in the United States was made previously to 1850 by the Smithsonian Institution, which secured telegraphic reports upon temperature, atmospheric pressure and rainfall from a number of stations east of the Missouri river. This was the inception of the system of daily weather forecasting which has become so popular and useful to the public.

Upon the foundation thus prepared by series of observations covering a period of fifty years, the structure of the National Weather Bureau was erected by the general government in 1870. In Iowa five regular and fully equipped stations have been established by the government, as follows: At Davenport in 1872; at Keokuk and Dubuque in 1873; at Des Moines in 1878, and at Sioux City in 1889. The Iowa weather Service was organized in 1874, the special object being to collect climatic data from a much larger number of stations than were provided for by the national service. In 1878 the general assembly made an appropriation to defray a portion of the expense of the state service, and named Dr. Hinrichs as director. In 1890 the service was re-organized and made co-operative with the National Weather Bureau, and its scope was enlarged by providing for the collection and tabulation of statistics of the acreage and yield of staple farm crops in addition to the climatic records. By this system of co-operation it is believed, the state is recipient of a much larger measure of benefits than might be secured by the independent operation of either the national or state service.

Climatology is properly included as a branch of physical geography, correlated to geology; and, therefore, as a fitting prelude to the study of climate and crops, the following paper on "The Physiography of Iowa" has been generously contributed by Prof. Samuel Calvin, chief of the state geological department. In this most excellent paper we have a clear presentation of some of the results of surveys and studies made by the able scientists of the geological corps. The foundations of agricultural empire appear to have been laid deeply and securely in this central valley during the far distant glacial epoch, when the ponderous ice mills were grinding the primeval rocks, "slowly but exceeding fine," to provide a covering of drift as the bed of the richest deposits of soil found on earth.

PHYSIOGRAPHY OF IOWA.

By Prof. Samuel Calvin, State Geologist.

General Statement.—It would seem that a very short chapter ought to be sufficient to include all that can be said concerning the physical features of Iowa; for the state is simply an extensive plain—over large areas a very monotonous plain—lying between the great rivers and rising but little above them at any point. The relief is small. The zero point on the river gauge at Keokuk has an elevation above tide of 477 feet; the elevation of Sibley, the highest important railway station in Iowa, is 1,572 feet. It is possible that Ocheyedan mound or some of the morainic prominences in Osceola county rises 100 feet higher than Sibley, but even then there is less than 1,200 feet of difference between the lowest and the highest points in the state. One hundred feet is gained at once by ascending the bluffs at Keokuk and passing on to the upland a short distance northwest of the city, and so there is left but about 1,100 feet as the sum of all the variations in level occurring over the general surface of the whole great state of Iowa. There are stretches, many miles in extent, so monotonously level that differences in altitude are scarcely perceptible.

TOPOGRAPHY.

Larger Features.—Looking at the state as a whole there are a few conspicuous topographic features worthy of special note. On the eastern border the Mississippi flows in a gorge which, at New Albin and Lansing, measured from the summit of the bluffs facing the valley, is 400 feet in depth. From the level of the divides a short distance back in the interior, the depth exceeds 600 feet, an amount equal to more than half the sum of all the variations in altitude encountered in the entire state. The depth of the Mississippi gorge diminishes toward the south. Instead of measuring from 600 to 700 feet between the flood plain and the higher levels as in the northeastern corner of the state, there is a difference in altitude between Dubuque and the upland at Peosta of only 430 feet; between Davenport and Walcott the difference is 190 feet; between Keokuk and New Boston, 140 feet. Furthermore the valley is a curious patchwork of newer and older parts. At New Albin, Clinton and Burlington the valley is old, wide and deeply filled with mud. It is comparatively young at Dubuque, and younger still at Le Claire. Twice at least in the course of recent geological history the great stream has been forced to abandon parts of its old valley and cut several miles of channel relatively new. The narrow, rock-bottom gorge above and below Le Claire is yet unfinished; adjustment of stream to valley is not yet complete.

The valley of the Missouri river is very different from that of the Mississippi. It is bordered by a series of bluffs unique in appearance and more unique in structure, for they have been built up largely of fine dust transported by the winds. The constantly shifting meanders of the stream and the great width of the level alluvial flood plain are among the striking characteristics of this peculiar valley.

Another of the larger topographic features is the great watershed. This is the ill defined ridge which extends in a sinuous course from Dickinson county to Wayne and forms the line of parting between the waters flowing to the Mississippi on the one side and to the Missouri on the other. The watershed is in reality the southward extension of the noted ridge of the Dakotas and southwestern Minnesota, known as the *Coteau des Prairies*. An area somewhat greater than two-thirds of the state lies east of the watershed; less than one-third lies on the west.

In the eastern area there is a comparatively short but rather important ridge which is followed for some distance by the railway passing through Calmar, Ridgeway, Cresco and Bonair. At Bonair the altitude is more than 1,300 feet. On one side the general slope is toward the Upper Iowa and the Mississippi; on the other side the surface inclines strongly toward the southwest, the inclination being continued as far as the Cedar river. The stream last named occupies the bottom of a broad trough which has the Cresco-Calmar ridge for one margin, while Wesley in Kossuth county is situated on the divide which forms the western rim. The eastern side of the trough presents the interesting anomaly of a region drained by streams which flow at an angle of but little less than 90° with the general inclination of the surface. For example, the direction followed by Crane creek and the numerous branches of the Wapsipinicon is toward the southeast, but there is a much greater fall to the mile toward the southwest. The southwesterly slope of the surface is indicated by the following series of altitudes taken along a line nearly at right angles to the present drainage: Arlington, 1,113; Oelwein, 1,049; Fairbank, 1,000; Dunkerton, 945; Dewar, 889; Waterloo, 841. In this direction, across the drainage courses, the average fall is more than seven feet to the mile. Between Oelwein and Waterloo the fall per mile is exactly eight feet. In the direction of the drainage the average slope of the surface is less than four feet to the mile. That the Cedar river flows in the axis of a great trough is farther illustrated by such a series of altitudes as the following, taken along the line of the Chicago, Milwaukee & St. Paul railway: Calmar, 1,263; New Hampton, 1,169, Charles City, at the bottom of the trough, 1,014; Nora Springs, 1,070; Mason City, 1,132; Garner, 1,223; Britt, 1,235; Wesley, 1,258. Clear Lake is omitted from this last series for the reason that it is located in the morainic ridge of the Wisconsin drift and so stands above the general level of the surface sloping toward the Cedar river.

Minor and More Localized Features.—On the basis of the effects produced by the great ice sheets of the glacial epoch, the surface of Iowa may be divided into two parts, to be known respectively as the Driftless Area and the Drift-covered Area. So far as size is concerned the driftless area is quite unimportant, for it covers only the small fraction of the state embraced in Allamakee county, and parts of Winneshiek, Fayette, Clayton, Dubuque and Jackson. But, small as it is, it presents topographic features in some respects more interesting than all the rest of the state together. As the name implies, this area was not invaded by the ice sheets of any of the stages of the glacial epoch. Its soils are largely residual, for they have resulted directly, in place, from the decay of the local limestones, sandstones and shales. Its topography is a product of erosion acting upon indurated rocks of varying degrees of hardness and varying degrees of elevation above base level. The driftless area is a land of thin soils, high, rocky precipices, long steep hills and deep rock-cut valleys. It is a picturesque land. The main streams have made valleys that are from 600 to 700 feet in depth, measured from the higher points to the divides. The upper Iowa—or the Oneota as it might better be called—flows between rocky bluffs which in places rise almost sheer to a height of 300 feet above the level of the water, and from their summits the surface, in many long swells and undulations, rise 300 feet higher to the tops of the dividing ridges which are back some miles from the stream. The whole surface of the driftless area has been carved into an elaborate system of branching and re-branching trenches separated by steep-sided ridges. The details of topography resulting from erosion are governed to no small extent by the geological structure of the region. The picturesque escarpments, buttresses, towers and castles which crown the bluffs and give charm to the scenery along the lower courses of the upper Iowa are due to the effects of the weathering on the hard, resistant, dolomitic formation called the Oneota limestone. We owe the impressive scenery above and below Decorah, culminating in those majestic cliffs at Bluffton, to the presence and characteristics of the Trenton limestone. The Galena limestone gives us the splendid castles, towers and other grand scenic effects about Dubuque. For the great Niagara escarpment, probably one of the most striking of the topographic features of the driftless area, we are indebted to another hard dolomite, the Niagara limestone. The Niagara escarpment forms the steep acclivity, looking like a line of bold hills, which curves around Dubuque at a distance of six or seven miles to the west and culminates toward the southwest in the high, promontory-like salient known as Table Mound. The escarpment makes up those conspicuous cliffs seen crowning the long slopes which form the walls of the valley of the little Maquoketa in the vicinity of Graf. It zigzags back and forth to accommodate itself to the rims of numerous small valleys opening to the Mississippi, between Table Mound and Bellevue. North of Dubuque the escarpment forming Niagara expresses itself in the steep slopes of Sherrill's Mound, and in a number of other prominent and symmetrical buttes of circumdenudation; and across the river, over yonder in Wisconsin, the eastern sky line is broken by another mass of Niagara, the far famed Sinsinewa.

The Maquoketa shales are the most important of the slope making formations coming to the surface in the driftless area. The gently inclined and largely cultivated plain, more or less trenched by erosion, which lies between the summit of the precipitous bluffs of Galena limestone at Dubuque and the foot of the steep Niagara escarpment six or seven miles to the west, is due to the presence of the Maquoketa shales. At some points near Graf the slope due to the Maquoketa is less than a mile in width, and detached blocks of Niagara limestone, loosened by frosts and other agencies from the escarpment above, gradually creep down the inclined surface to be at last precipitated into the stream over a cliff of Galena limestone. At no points are there better illustrations of the effects of structure on topography. Here are two hard limestones separated by shale; two steep escarpments separated by cultivated slopes.

Had it not been for the incursion of glaciers and the distribution of drift, the whole face of Iowa would have resembled the driftless area in many particulars. Thin soils, bare rocks, steep precipices and deep valleys would have prevailed everywhere. The effect of the successive ice sheets which in turn covered nearly the whole of Iowa, was to tone down and conceal the preglacial, rock-carved topography by spreading over it a deep mantle of drift. The drift-covered area occupies much the larger part of the state. In this region the topography is young as compared with that of the driftless area; it is in no way related to geological structure; its characteristic features are due partly to the manner in which the load of glacial detritus was distributed and deposited by the ice, and partly to the effects of erosion and other modifying influences acting on the mantle of loose materials since the glaciers disappeared. There were, however, not less than five different episodes of ice invasion for Iowa, each of long continuance, and separated one from the other by still longer interglacial periods, from which it follows that among the different sheets of drift consequent on the successive stages of glaciation, there are enormous differences in age. The glaciers of the later stages were not so strong and did not extend so far as those belonging to the earlier part of the glacial epoch. On many accounts it may be regarded as a fortunate circumstance that the geographical position of Iowa was so exactly related to the magnitude and movements of the later ice sheets that not less than three of them successively entered her borders and terminated by melting before advancing over more than a small fraction of her entire area. The terminal margins of these later glaciers have been mapped with a high degree of accuracy, and it turns out, fortunately again, that the particular parts of the state which the invading lobes of the later glaciers occupied, were not twice the same. The drift-covered portion of Iowa presents four well-defined areas, each having at the surface a sheet of drift differing in age and, to some extent, in origin, from the drift of either of the others. In some places, as, for example, south of a line drawn through Des Moines and Iowa City, the drift is very old; in other places, as in the middle northern counties of the state, the drift is very young. The topographic features of the several glacial areas vary with their age. The older drift, which has been long exposed to the action of weathering and drainage waters, has the upper zone profoundly changed, and the whole surface has been carved into an elaborate system of drainage trenches and deep stream valleys. The withdrawal of the latest ice sheet from Iowa is an event so recent that the surface of the younger drift is yet unaltered; it has not been affected in any way; it remains precisely as the waning glaciers left it.

The oldest glacial deposit known in the state does not appear at the surface anywhere. It is effectually covered by the drift of the second ice invasion, and is revealed only through the erosion of stream valleys and the making of artificial excavations. The second glacial invasion and the resulting sheet of till have come to be known in geological literature as the Kansan. The Kansan ice, flowing in this region from the northwest, covered the whole of Iowa except the small fraction belonging to the driftless area; it extended southward half way across Missouri; it spread westward into Nebraska and Kansas; eastward it joined other glaciers which radiated from centers of accumulation into Labrador, and so formed a continuous sea of ice reaching from central Nebraska to the Atlantic ocean. Outside of the comparatively small areas occupied by the younger sheets of till, the Kansan drift gives character to the surface of Iowa. The topography of the Kansan has been developed by erosion of the drift mantle. Valleys have been cut in the loose glacial clays to depths ranging from eighty to two hundred feet. The great age of the Kansan valleys is further indicated by the fact that they are broadly U-shaped, and their sloping sides are trenched by numerous lateral channels which branch and re-branch repeatedly until traced to their origin in a multitude of minute twigs up on the divides. The whole surface has been carved and shaped by flowing water and developed into an intricate system of rounded hills and ridges separated by steep-sided ravines. (Pl. I, Fig. 1.) Every foot of the surface is thoroughly drained. While the Kansan areas everywhere present the same fundamental type of topography, the erosional features are probably most strikingly developed in the counties drained by the forks of the Grand, Nodaway, Nishnabotna and other rivers of southwestern Iowa.

It is a wholly different type of topography from that noted above, that is seen between Wilton and Walcott, around Morning Sun and Mediapolis, between West Burlington and New London. These points all lie in an area of drift which rests upon and overlaps the weathered and eroded surface of the Kansan. An ice sheet having its origin in the Laurentian highlands south of Hudson Bay, flowed outward until it crossed Illinois and pushed over for a short distance into Iowa. This was the Illinoian stage of glaciation, and the detritus left on the surface when the ice melted is the Illinoian drift. The Illinoian drift is more or less trenched around its edges; near the larger river valleys, as between Walcott and Davenport, it has been carved by erosion so as to develop young, narrow and steeply graded ravines. But over the greater part of its area the surface is unchanged; the topographic features are due, not to the carving effect of drainage waters, but to the leveling and moulding influences of glacier ice. The drift of this small area in southeastern Iowa is young as compared with the Kansan.

The flow of the Illinoian ice across the Mississippi river into Iowa is responsible for another interesting bit of topography. Nichols is located in the midst of a level undrained area, the bed of an extinct lake. The Illinoian ice choked up the channel of the Mississippi from the mouth of the Wapsipinicon to the mouth of the Des Moines, and the waters of the great stream were diverted around the glacier front. Southward from West Liberty and Atalissa there was a low, wide basin which was hemmed in on one side by the high bluffs seen a mile or two west of Nichols, and on the other side by the thick margin of the Illinoian ice. The waters were ponded in this basin and formed an extensive glacial lake in which sediments composed of mud, sand and gravel accumulated. When the ice melted and the Mississippi returned nearly to its old course, the lake was drained, but the level floor of sedimentary deposits remains to bear testimony to former conditions. Lake Calvin, the name given to this ancient body of water, has been mapped and described by Udden; the level floor of the old Illinoian glacial basin attracts the attention of all observant travelers between West Liberty and Columbus Junction.

Embracing Buchanan, Black Hawk, Bremer, Chickasaw, Mitchell and a number of the other counties in northeastern Iowa, is an area of what is known to geologists as the Iowan drift. The evidences of newness, of youth, are much more strongly marked in the Iowan than in the Illinoian drift. There has been no alteration of the till and practically no erosion of the surface anywhere since the Iowan glaciers retreated from the state. It is true that, in places, the surface is more or less undulating and irregular, but such inequalities as do exist were brought about by the erratic and disorderly way in which the transported materials were distributed at the time the ice disappeared. Prior to the general occupation of the region by the white man, there were extensive undrained sloughs covering a large percentage of the entire area. The rivers of the Iowan region illustrate in an ideal way the characteristics of young streams. They have cut no valleys; they simply flow in narrow, shallow trenches at the level of the drift plain. The minor drainage courses are very largely broad sags in which there is not, as yet, even the beginning of a definite stream channel. Cultivation and artificial drainage have wrought greater changes in the surface, in the last score or two of years, than had been accomplished in all the preceding centuries since the Iowan stage came to a close. Large granite bowlders ranging up to thirty, forty, or even fifty feet in diameter, are characteristic features of the Iowan area. The outer margin of the Iowan plain is usually quite sharply defined by a thickened ridge of the fine silt-like clay called loess. (Pl. I, Fig. 2.) From the summit of such a marginal ridge the observer looks outward upon the billowy and deeply eroded surface of the older Kansan (Pl. I, Fig. 1); in the other direction the young, uneroded Iowan plain extends away to the horizon, as level as the surface of the sea. (Pl. I, Fig. 3.)

Younger than the Iowan is the Wisconsin drift, which, so far as our own state is concerned, covers an area nearly triangular in shape. The base of the triangle, where the comparatively narrow ice lobe crossed from Minnesota to Iowa, extends from Worth county to Osceola; the apex is at Des Moines. Through the western part of Worth, Cerro Gordo, Franklin and Hardin counties the edge of the Wisconsin drift overlaps the Iowan; the apex of the Wisconsin lobe rests at Des Moines on the older Kansan. The Wisconsin area is in general a level ill-drained plain. The traveler may go for scores of miles without seeing a definite drainage trench so much as a foot in width or depth. Saucer-shaped depressions or "kettle holes," varying from a rod or two, to an eighth or a quarter of a mile in diameter, are common features of the Wisconsin plain.

The Wisconsin, more than any of its predecessors, was a moraine forming ice sheet. Part of the transported materials was piled up around the margin of the lobe in a bewildering series of disorderly hills or knobs, varying from eighty to one hundred and fifty feet in height. A well characterized belt of lawlessly heaped up morainic knobs six to ten miles wide, extends from the north line of Worth county to the south line of Cerro Gordo, from which point southward the knobby character of the Wisconsin margin becomes less pronounced. Pilot Knob, near the northeastern corner of Hancock, is the most noted and the most prominent of these great morainic heaps of drift. The marginal moraine is well developed at many points along the western edge of the Wisconsin lobe. It forms a belt of more or less prominent hillocks and knobs passing through Osceola, Clay, Buena Vista, Sac and Carroll counties. As on the eastern margin, the morainic characters gradually fade out toward the south. While the Wisconsin ice lobe was slowly melting and disappearing from the state, the retreating margin halted at intervals for periods long enough to pile up con-

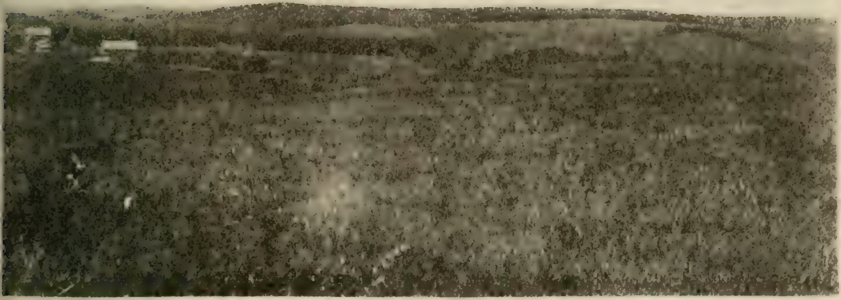


FIG. 1.

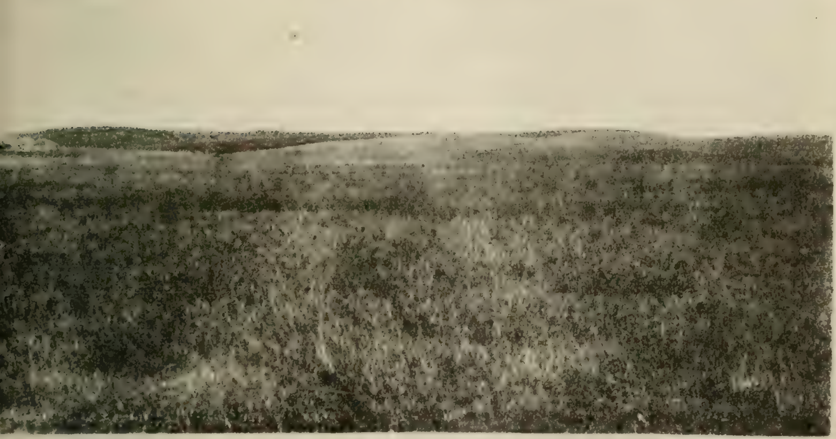


FIG. 2.

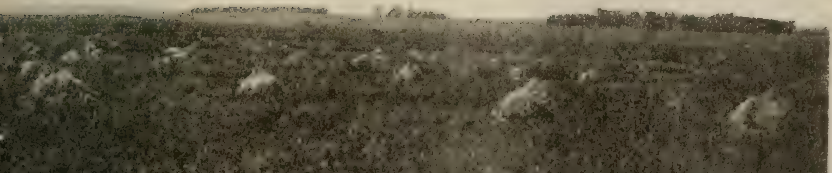


FIG. 3.

spicuous recessional moraines; and so areas of knobby drift of considerable extent are distributed in the Wisconsin area at varying distances from the outermost margin. Recessional moraines are especially well developed in Palo Alto, Emmet and Dickinson counties.

Intimately related to the subject of Wisconsin moraines are the many charming lakes of Iowa. There are no lakes worthy of note in the Kansan, Illinoian or Iowan areas. All our lakes are of Wisconsin age, and most of them occupy basins in the irregularly piled morainic ridges. Indeed it was the very lawlessness accompanying the deposition of the morainic materials that left the enclosed basins in which imprisoned waters might accumulate. Clear Lake lies in such a basin in the eastern moraine, surrounded by prominent constructional hills and knobs. Spirit Lake, the Okobojis and a number of beautiful but less important sheets of water in the same part of the state, are all located in an extensive morainic belt belonging to the recessional series. The beauty and charm of all these delightful bodies of water are greatly enhanced by the eccentricities of distribution, and the ever varying curves and slopes and outlines, of the surrounding morainic knobs.

Among the interesting, though rather inconspicuous topographic features of the lake region are the walls, embankments and causeways which coincide in position and direction with lake margins, and often present the deceptive appearance of railway grades or other artificial structures. So common are these that they may be expected to occur somewhere, in some form, along the margin of every considerable sheet of water in northern Iowa. The conspicuous ridge of sand, gravel and bowlders lying along the lake shore in front of the Assembly grounds at Clear lake, must be familiar to every visitor. When this marginal feature of our northern lakes assumes the form of a rude wall of cobbles and bowlders, it seems to be capable of taking a stronger hold on popular attention and popular imagination. Hence it is that our Walled Lakes have long been famous, descriptions of them occupying column after column in newspaper and magazine, while other lakes bordered by embankments of plain sand and clay, though equally as interesting and instructive, equally as worthy of investigation and comment, have suffered the neglect and inattention that usually falls to modest, unobtrusive merit.

These marginal ridges and walls, along the shores of northern lakes with shallow basins, have been heaped up by the expansion of ice in winter. In our severe climate, particularly if the snowfall be not great, quite an extent of shoal water near the shore freezes to the bottom. Indeed the effects of freezing go deeper than the water, and bottom sands and clays and bowlders become a part of the frozen sheet. The alternations of temperature, such as take place between colder and warmer days or between noon and midnight, affect the volume of the ice in such wise that from day to day it expands and is thrust shoreward with tremendous energy. The resistance is least on the low, gradually sloping shores, and here the movements are most pronounced. The marginal ice, with all the materials frozen in its lower surface, is shoved up on the slope, and stones and earth are left as a contribution to the growing ridge or wall when melting takes place in the following spring. The process has been going on for centuries, and where the conditions have been most favorable, the results are somewhat surprising.

The curious peaks and knobs of the wind-drift topography, developed on the bluffs facing the Missouri river, need only be mentioned. There is here a perpetual contest between erosion and construction, which has resulted in many erratic forms. This type of land surface is best seen in Iowa in a narrow belt extending from Sioux City to Hamburg.

DRAINAGE.

The rivers of Iowa fall naturally into two systems—the Mississippi system and the Missouri system. The headwaters of the two systems are separated by the great divide. The Upper Iowa, or Oneota, has a more than usually distinct drainage basin, for in its upper courses it is separated from the other rivers of the eastern slope by the Cresco-Calmar ridge. Looking at the rivers of the state as a whole, there are only a few points deserving special mention. The streams and stream valleys of the driftless area are unique. They are comparatively old. The waters began working on their present channels before the beginning of the earliest glacial stage. The valleys, in places ten or fifteen miles in width from crest to crest of the divides, have been cut to depths of 500, 600, or even 700 feet. Near their mouths the process of down-cutting, or corrasion, has brought the streams to base level, and the walls of the valleys have receded so as to give broad alluvial flood plains covered with what is probably the most productive soil in this great fertile state. In the upper courses of the streams of the driftless area, and in all the smaller tributaries, the gradients of the valleys are steeper, flood plains are absent, adjustments are not yet perfect. In some portions of this area the minor drainage is largely underground, a fact well demonstrated by the numerous springs which pour out copious volumes of water along the hillsides and the steep river bluffs. In the area of the Kansan drift, water-cut channels have been developed everywhere, and practically every foot of the surface is thoroughly drained. None of the basins and sags which must have been present in the original surface of the Kansan drift have been left undivided. The whole area of this drift sheet, where not concealed by younger deposits, is characterized by a miniature type of mature erosional topography; but surface drainage has worked to best effect on the shorter and steeper slope west of the great divide. Here the river valleys are deeper and wider, and the numerously branched lateral channels have cut back and become deeply entrenched in the higher plateaus. The rivers of the Iowan area have done but little work since they began to flow in their present courses. Lateral drainage is not well developed; there are large areas in which the surface remains just as it was left by the glaciers; not a little of this surface is yet without effective means for getting rid of the surplus storm waters. On the east slope of the great Cedar valley trough the several streams drain areas which are remarkably narrow in proportion to their length. Apart from the branches of the Des Moines river, there are no important streams in the area of the young Wisconsin drift. Over the greater part of the Wisconsin plain even the rudiments and beginnings of effective drainage have not yet been established.

The physical features of Iowa are conspicuously lacking in the rugged and impressive types which characterize many of the states. The relief forms are relatively tame. The scale on which they are designed is an exceedingly modest one. What is lost in the matter of bold and massive grandeur, however, is more than compensated for in the quiet charm of our rock-walled river valleys and other erosion forms of the driftless area; in the beauty of our clear crystal lakes nestling among morainic hills; in the hope and joy inspired by fertile plains loaded with bounteous harvests and stretching on in endless vistas to the far horizon; in all the evidences of peace, comfort, intelligence, wealth and prosperity which everywhere abound within our borders. The uniformity of the surface of our state, and the physical agencies which produced this uniformity, are to be reckoned among the fundamental causes of Iowa's marvelous success, a success which states of more rugged topographic forms could not possibly attain. But a full discussion of the causes of the physical features of Iowa, and their consequences in connection with the progress and development of her people, while making an interesting chapter, would make one too long for our present purpose.

IOWA CLIMATE AND CROPS.

Iowa easily holds the foremost place among agricultural states. Statistics of its soil products and live stock industry justify this claim, and a careful study of climatic records and vast resources of soil fertility will reveal the cause of its primacy in agriculture. Its location within the greatest corn-producing area in this country or the world is especially favorable. In fact, it may be claimed without exaggeration that Iowa constitutes the most productive portion of the far-famed corn belt of America; the statistical records of the past thirteen years will sustain it. The distinctive feature of this state is the fact that about 95 per cent of its area may be made to produce something of value. And fully 90 per cent of its surface is exceedingly rich in the elements of plant growth. In a paper entitled "What Glaciers have done for Iowa," Professor Calvin wrote as follows concerning the value of its soils:

> The soils of Iowa have a value equal to all the gold and silver mines of the world combined. In fact it is difficult to find sources of wealth with which our soils may properly be compared. And for all this rich heritage of soils we are indebted to great rivers of ice that overflowed Iowa from the north and northwest. The glaciers in their long journey ground up the rocks over which they moved and mingled the fresh rock flour, derived from granites and other crystalline rocks of British America and northern Minnesota with pulverized limestones and shales of more southern regions, and used these rich materials in covering up the bald rocks and leveling the irregular surface of preglacial Iowa. The materials are, in places, hundreds of feet in depth. They are not oxidized or leached, but retain the carbonates and other soluble constituents that contribute so largely to the growth of plants. The physical condition of the materials is ideal, rendering the soil porous, facilitating the distribution of moisture, and offering unmatched opportunities for the employment of improved machinery in all the processes connected with cultivation.

In their appointed time those ancient glaciers wrought well in preparing the material and overspreading the rocky valley with drift. That formative period in earth-building was succeeded by more genial climatic conditions, with alternations of wet and dry seasons like those of recent years, with fervent heat of summer and intense cold of winter, producing growth and decay of vegetation for unnumbered thousands of centuries, and transforming the surface of the drift deposits into a mantle of humus as rich in the elements of plant growth as the famed valley of the Nile. There is no continent on earth that contains so large an area of exceedingly fertile lands as we have in the great corn belt of America.

CLIMATE THE CHIEF FACTOR.

In crop production the prime factors are fertility of soil and a congenial climate; and climate is the chief factor. There are millions of acres in this country, now comparatively worthless though containing abundant supplies of fertility, the one thing lacking being a favorable climate. Nothing can fully compensate for the lack of ample moisture in the growing season, as only a small part of any arid region may be made productive by irrigation. And prevalent low temperature, or frequent occurrence of frosts in the crop growing season, will render nugatory the most fertile soil and abundant rainfall. The true tests of climatic excellence are found in the tables of mean temperature and precipitation, and the average number of days between killing frosts in the crop season. Iowa has attained its present unrivaled position as an agricultural state by its heritage of vast wealth of soil and its generally favorable climate. In attestation of that claim the appended tables of annual crop yield may be cited. There has been nothing near a total failure of the staple farm crops in the worst season experienced since its settlement by civilized people. There have been lean and fat years, but the products of the leanest season would be fatness to the people of less favored regions. This is the result of the fine texture and great depth of soil, whereby it is able to endure the greatest extremes in form of wet or dry seasons.

GENERAL CLIMATIC FEATURES.

Situated near the geographical center of the United States, too far inland to receive the equalizing thermal effects of winds blowing directly from the oceans, the climate of Iowa is strictly continental in type. This implies a very wide range in temperature, winters of considerable severity, summers of almost tropical heat, and a large percentage of sunshine as compared with insular regions. As there are no mountain ranges, nor considerable differences in the altitude of the several sections, the climate of the state is quite homogenous, with only such variations of temperature and rainfall as result from latitude and location with reference to the pathway of the cyclones which traverse the continent. Despite its remoteness from the oceans, the seasonal constants of temperature, humidity and precipitation afford a guaranty of ample production in the future as in the past. In fact, it is the best watered and most productive mid-continent region known on earth. Its worst droughts and seasons of floods have never been famine breeders.

Climate is the product of certain elements and properties of the atmosphere, and physical features of the earth's surface. The sun's energy produces in the air and earth the threefold forms of force termed light, heat and electricity, and causes the varied phenomena of evaporation and precipitation. The climate of this section differs from that of other midland regions bceause of material differences in the topographic features of the western continent. The great mountain ranges that gridiron the western third of the continent, stretching from the Arctic Sea to the isthmus and enclosing numerous valleys of the semi-arid or desert type, effectually cutting off the rain-bearing winds that blow inland from the Pacific Ocean; as a result the eastern slope of the Rockies receives a scant and irregular supply of rainfall, and the Mississippi valley practically receives no moisture from that source. The western and northwestern winds in this section are cool and dry, while the southerly and easterly winds are warm and moist, affording generally an ample supply of rainfall. If the great mountain ranges had been stretched diagonally across this continent, cutting off this region from the rain-bearing wind currents from the Gulf, this section would be in reality the great American desert, instead of the richest domain of Ceres.

It appears, then, that the essential features of the climate of this region are determined by the size and general topography of the continental area at the westward, the height and location of the mountain ranges, the direction of the prevailing winds, and the general movement of the ''highs'' and ''lows'' that cross the valley.

PRECIPITATION.

Nearly the entire amount of moisture precipitated over Iowa and contiguous portions of the Mississippi valley comes directly or indirectly from the Gulf of Mexico. The mechanics of this irrigation process may be understood quite readily. By cyclonic force, or the powerful suction of low area storms of a rotary character, the warm, moist winds from the south are drawn up into the valley, and by dynamic cooling are made to deposit a goodly portion of their burden of moisture. It may be said, therefore, that this valley is watered by cyclones, which in their mechanical action and effect may be termed vast rotary pumps, and condensers of atmospheric vapors. This great central depression, which may be called the ''trough of the continent,'' extending from the Gulf to the Arctic Sea, gives an unobstructed pathway for the warm and moist south winds and the cool waves from the north, which here commingle in the atmospheric eddies, and refresh the earth with copious showers.

The heaviest annual precipitation is deposited in the region near the Gulf, and there the bulk of it comes in the fall, winter and early spring, frequently in excessive downpours. In considerable portions of the Gulf region the mean annual rainfall is double the average in Iowa, and as a result commercial fertilizers are in demand to restore some measure of the loss of fertility caused by the washing and leaching process. This state is more fortunately located, in the region of the golden mean between the extremes of heavy precipitation at the south and east, and general deficiency at the west and northwest. In other words, the people of Iowa suffer less damage from excessive rains than their neighbors at the east and south, and very much less harm from drouth than their neighbors in the western and northwestern part of the interior valley.

At an early day in various historic and scientific publications this state was credited with a mean annual precipitation of 40 to 47 inches. This high average was obtained from insufficient climatic data, collected at a few stations in the extreme east and southeast parts of the state, where the yearly average is somewhat greater than in the west and northwest districts. Since that early period stations have been established in all parts of the state, and from the mass of observations obtained the true mean is found to be 31.40 inches. During the past thirteen years, the voluminous records collected by the Iowa Weather and Crop Service show the state average to have been 31.07 inches.

Prof. Lorin Blodgett's hyetal chart of the continent, published in 1855, placed Iowa in the belt having a range of 25 to 40 inches, the southeastern counties showing a mean of about 40 inches, the central belt from southwest to northeast, 30 inches, and the northwestern fifth of the state, about 25 inches. The more recent observations do not show so great difference in the yearly rainfall of these sections. A bulletin issued by the Weather Bureau in 1897 contained a rain chart in which Iowa was placed in the belt having an average of 30 to 40 inches, except an area of a few thousand square miles in the belt ranging from 20 to 30 inches. Rainfall tables in the following pages show that no single station having a record for more than ten years has an average as high as 40 inches, and no station for a like period has an average below 23 inches per year.

RAINFALL DATA BY DISTRICTS.

For convenience of reference and comparison, the state is divided into three belts, or sections, on lines running east to west, each section three counties in width. These sections may be subdivided into three districts, following county lines, giving us nine districts, designated as follows: Northeast district, seven counties; North Central district, fourteen counties; Northwest district, nine counties; West Central district, nine counties; Central district, fifteen counties; East Central district, fourteen counties; Southeast district, ten counties; South Central district, thirteen counties; Southwest district, nine counties. The tables show the following yearly averages by districts: Northeast, 32.25 inches; North Central, 29.40 inches; Northwest, 28.16 inches; West Central, 29.36 inches; Central, 31.66 inches; East Central, 32.61 inches; Southeast, 33.65 inches; South Central, 32.53 inches; Southwest, 32.60 inches, It will be seen that the Southeast district has a yearly average of 5.49 inches more than the Northwest district, and only 1.05 inches more than the Southwest district.

The annual average rainfall of the three eastern or Mississippi river districts is 32.50 inches; three Missouri valley districts, 30.04 inches—a difference of 2.46 inches between the eastern and western slopes of the state. The central belt on north and south line has an average of 31.51 inches, or very nearly the state average. On the east and west line of division the averages are as follows: Northern section, 29.93 inches; central section, 31.21 inches; southern section, 32.92 inches. These figures show a quite regular gradient of decrease in yearly amount from south to north, as well as from east to west.

RAINFALL IN THE CROP SEASON.

From an agricultural point of view the most important feature of the climate of Iowa is that its maximum of rainfall comes in the crop season, April to September, inclusive. The average winter precipitation is 3 30 inches, or 10 per cent of the yearly amount; spring, 8.85 inches, 28 per cent; summer, 12.15 inches, 39 per cent; autumn, 7.10 inches, 23 per cent. In the six crop months the average rainfall is 22.48 inches, or 71 per cent of the annual total. And in the four most critical crop months, May 1st to September 1st, the average for the state is 16.29 inches, or 51 per cent. It will be seen from these figures that the bulk of precipitation is distributed through the months when it is needed for irrigation, while in the balance of the year it is relatively dry. This feature of the climate is more in evidence in the western districts than in the balance of the state. By districts the percentages of the rainfall in the six crop months are as follows: Northeast district, 70 per cent; North Central district, 74 per cent; Northwest district, 77 per cent; West Central district, 74 per cent; Central district, 72 per cent; East Central district, 68 per cent; Southwest district, 66 per cent; South Central district, 70 per cent; Southwest district, 73 per cent. The Missouri valley receives the least amount, but gets a greater percentage in the crop season. In other words, the fall and winter precipitation is much lighter in the west than in the east. So there is in this state a wet and dry season, about as well defined as in some of the tropical countries.

Professor Blodgett, in his American Climatology, referring to this feature in this climate, said: "For the whole period of the warm months the quantity of rain distributed over the Mississippi valley is very great, and there is no great area so far in the interior which presents a similar result. The quantities are absolutely as well as relatively large, and they considerably exceed those of the plains of the Atlantic coast in the same latitude."

VARIATION OF RAINFALL.

Meteorological records in all parts of the United states show marked variation in the seasonal rainfall, and a perpetual succession of wet and dry periods, though the general averages are steadily maintained through long periods. There are some faint suggestions of periodicity in the occurrence of wet and dry seasons, but the complex problems relating to the variableness of the weather have not been solved. All long-time tables of monthly and annual precipitation show that the distribution is exceedingly erratic, though the totals for the continents and hemispheres may be about the same from year to year. During the past thirteen years the lowest yearly average for this state was 21.91 inches in 1894, and the largest amount was 43.82 inches in 1902. At single stations the range in total rainfall is much greater than for the state at large. It has occurred quite frequently that considerable portions of the state suffered from excess of moisture, while other districts were complaining of drought.

In 1894 the state average for the four critical crop months (May-August) was only 6.75 inches, or a monthly average of 1.68 inches. In 1902 the total for that period was 27.80 inches, or 6.95 inches per month. And yet portions of the state received about the normal amount of rainfall. Evaporation and precipitation are constants, but we have no means of determining in advance where the vapor will be precipitated, for that is subject to vicissitudes in the ebb and flow of the great atmospheric currents of the continent.

Since the early settlement of this section the records show that quite severe midsummer droughts have occurred at irregular intervals, averaging from one to three in each decade. The normal amount for the four critical months is 16.21 inches. During the past thirteen years this was exceeded seven times, and the average fell below the normal six times. There has been, in fact, a greater liability toward excess than deficiency in the crop months, and more real damage to crops in this state has been caused by excess in the season of planting and growth than by the reverse.

In this connection the fact may be noted, especially in seasonal rainfall, that there is a tendency in nature which causes one extreme to be followed by another; and this oscillation from dry to wet, or vice versa, may occur quickly, or it may run through two, three or four years. In the biennial period of 1901-1902 there was a very rapid swing of the pendulum from excessive heat and drought to the opposite extreme of cold and wet weather. And in respect to quality and commercial value the soil output of 1901 was much better than that of 1902. Generally, it may be said, the predominant influence in this valley in midsummer is much stronger toward prolongation of wet weather periods than the dry weather type. A considerable portion of the summer rainfall comes in form of local showers, which irrigate narrow belts and short distances; and it not infrequently happens that a portion of a single county may be well watered, while other parts are greatly in need of moisture.

Though subject to very considerable fluctuations in the amount of rainfall in the crop season, there is a measure of compensation in the deep, rich and porous soil of this state, which has produced fairly good crops in the driest or wettest seasons. In the worst season ever experienced in this portion of the great valley there has been no near approach to a famine. The most severe drought within the past fifty years occurred in 1894, and yet this state produced in that year 256,000,000 bushels of cereals, and sufficient other soil products to swell the total value to over $121,000,000. The superior quality of Iowa soil was noted by the late Prof. T. S. Parvin, who in a contribution to the *American Journal of Science*, Vol. XIII, said: "In 1854 occurred the great drought in this and the western states generally; but owing to the porous nature of our soil the crops with us turned out much better than in the states east of the Mississippi. In 1856 the season was also very dry, the total quantity of rain in the summer months being only 6.78 inches, or 10.20 below the summer mean. The crops were, notwithstanding, more than an average yield, both of corn and small grain; and the three or four dry seasons we have had abundantly prove that the soil and climate of Iowa are unsurpassed on the continent for farming purposes."

TEMPERATURE.

On the climatological map published by the United States Weather Bureau, Iowa is situated in the isothermal belt wherein the mean annual temperature ranges from 45° to 50°. The lines inclosing this belt run nearly parallel from the Missouri valley to the Atlantic coast, and embrace a large part of the territory between 41° and 44° north latitude. The mean annual temperature of this state is 47.5°. By sections the mean temperatures are as follows: Northern section, 45 7°; central section, 47.3°; southern section, 50°. The highest yearly mean at any station is 51.7°, as shown by records of the Weather Bureau station at Keokuk; the lowest is 43.2°, according to records of voluntary stations at Osage and Cresco. From the south line of the state to the Minnesota boundary the temperature gradient is quite uniform, making due allowance for differences in altitude of stations

In this part of the Mississippi valley the summers are warmer and the winters colder than on the same parallels near the Atlantic coast. In July the 75° isotherm passes through the southern half of Iowa, dips southeastward below Cincinnati, passing between Baltimore and Philadelphia. The mean maximum of the state for July is 85°, and the midsummer temperature is about as high as that of Virginia and North Carolina. In January the larger part of Iowa is within the isothermal belt 15° to 20°. These lines run northwestward through Wisconsin, northern Michigan, Ontario, northern New York, Vermont, New Hampshire and Maine. The midwinter temperature corresponds to that of the vicinity of Montreal, while the summers are as warm as in Washington, D. C., and Richmond, Va. The winters, however, are shorter than in the same latitude in the Atlantic states. The transition from winter to summer is usually quite rapid, the average increase in temperature in April being more than half a degree daily. The daily mean of April is 17° higher than that of March, and May averages 11° per day higher than April. The season of seeding and planting is 8 to 12 days earlier than in the eastern states. The autumns are usually drier and warmer in Iowa than in the coastal regions on the same parallels. The average duration of summer temperature, the daily means ranging from 65° to 75°, is about four months. The average duration of winter, or the period having a mean below 30°, is about three and a half months.

The highest temperature registered in Iowa by a standard thermometer was 113°, at Sigourney in July, 1901. The lowest temperature recorded was 43° below zero, at Cresco, in January, 1888. These records indicate the remarkable range of 156° from minimum to maximum temperature. These extremes of heat and cold are rendered more endurable to man and beast by the prevalent dryness of the air at the time of their occurrence. In the humid air of insular regions such extremes would be intolerable. In this connection it may be stated that both heat and cold are important factors in the production of the great crops for which this section is noted. The myriad plowshares of the frost penetrate the earth to great depths, pulverizing the clods and preparing the soil to respond to the quickening influence of the gentle rains of spring and the almost tropical heat of summer. This is not an ideal climate for invalids, who need equable temperature, but no country is better adapted to develop hardy, stalwart and brainy people than this valley, where the rigors of winter incite men to a strenuous life. Some adverse conditions seem to be necessary to develop hardiness and vigor in plants, animals and mankind. The best types of all races have been reared about midway between the tropics and the Arctic zones.

The following table shows the monthly and annual mean temperatures for the state, for the thirteen-year period, 1890 to 1902, inclusive. This is followed by a table showing the averages by districts and sections, and also for the state at large, for all the years of record. A slight difference will be noted in the state averages for the thirteen-year period, as compared with the means shown in the latter table:

MONTHLY AND ANNUAL MEAN TEMPERATURES FOR THE STATE—1890-1902. (DEGREES.)

YEAR.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Annual.	Winter mos.	Spring mos.	Summer mos.	Autumn mos
1890	19.7	26	28.0	51.8	57.7	72.7	75.6	8.4	59.3	49.2	38.6	29.1	47.7	24.9	45.8	72.2	49.0
1891	26.0	19.4	26.8	50.6	58.3	69.1	68.6	69.1	67.3	50.0	30.5	32.3	47.4	25.9	45.2	68.9	49.2
1892	15.3	28.1	31.9	45.4	54.0	69.2	73.0	71.4	64.7	54.5	33.3	18.9	47.5	20.7	43.7	71.2	50.8
1893	9.3	16.4	31.9	45.5	56.6	71.2	75.0	69 4	64.7	52.4	34.0	22.0	45.7	15.9	44.6	71.7	50.3
1894	19.3	19.7	41.0	51.7	61.1	73.2	76.4	74.6	65.1	51.7	32 7	30.1	49,7	23.0	51.2	74.7	49.8
1895	13.6	16.4	34.4	54.2	61.7	6[illegible].7	72.1	71.9	66.8	46.0	34.3	25.2	45.5	18.4	46.7	71.2	49.0
1896	23.4	27.4	30.9	54.5	65.5	69.1	73.6	71.7	58.5	47.9	29.6	30.8	48.5	23.8	50.3	71.4	45.0
1897	17.2	24.6	32.0	47.9	59.6	69.1	75.6	68.9	70.9	56.8	34.3	18.0	46.7	19.9	46.1	71.2	54.3
1898	23.4	24.2	37.5	48.1	59.6	71.4	73.4	71.2	65.3	47.5	32.2	18.1	47.6	21.9	48.4	72.0	45.0
1899	19.8	12.2	24.5	48.9	60.2	70.7	73 1	74.4	62.5	56 7	43.9	22.6	47.6	18.2	44.5	72.7	51.3
1900	25.6	14.8	30.7	52.2	63.2	69.7	73.4	77.4	64.4	59.3	33.5	26.9	49.5	22.4	48.7	73.5	52.4
1901	23.7	17.5	33.2	49 9	60.7	72.3	82.4	73.8	63.3	54.2	35.8	20.5	49.0	20.5	47.9	76.2	51.1
1902	22.4	17.6	39.1	48.2	63.8	65 2	73.1	69.1	59.1	53.5	41.2	20.1	47.8	20.0	50.3	69.1	51.2
Means	19.9	20.3	32.5	49.9	60.2	70.2	74.3	71.6	64.0	52.3	34.9	24.2	47.7	21.2	47.2	72.0	49.9

MONTHLY AND ANNUAL MEAN TEMPERATURES BY DISTRICTS AND SECTIONS.

DISTRICTS.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Annual.
Northeast District	17.0	16.6	30.1	47.[illegible]	59.4	68.2	72.7	70.6	62.2	51.0	33.0	20.5	45.7
North Central District	17.5	16.2	29.2	46.4	59.3	68.3	73.1	70.1	61.9	50.4	32.1	19.5	45.4
Northwest District	17.8	16.9	29.8	48.4	59.0	68.4	73.3	71.2	63.0	51.1	31.8	20.6	46.2
North section averages	17.4	16.5	29.6	47.3	59.3	68.3	73.0	70.5	62.3	50.7	32.3	20.1	45.7
West Central District	18 8	19.4	31.9	49.4	59.9	69.3	73.9	71.5	63.4	51.3	33.7	23.5	47.2
Central District	18.9	19 4	32 4	49.4	60.4	69.7	74.1	71.9	63.5	52.2	34.8	22.8	47.5
East Central District	18.0	21.3	32.1	48.1	60.1	69.5	74.2	71.3	62.9	50.8	34.8	23.4	47.1
Central section averages	18.5	20.3	32.2	48.8	60.2	69.5	74.1	71.6	63.2	51.4	34.6	23.2	47.3
Southeast District	23.5	23.7	36.8	51.7	62.8	72.0	76.2	74.2	66.4	54.7	38 5	26.7	50.6
South Central District	22.1	21.7	35.4	52.1	61.6	70.7	75.3	73.2	65.6	54.1	37.5	25.2	49.6
Southwest District	22.8	22.2	35 6	52.8	61.6	71.4	75.4	73.3	65.1	54.8	37.2	25 4	49.9
Southern section averages	22.8	21.5	35.9	52.2	62.0	71 3	75.6	73.6	65.7	54.5	37.7	25.7	50.0
State averages	18.2	19.6	32.4	49.3	60.4	69.6	74.2	71.8	63.6	52.1	34.7	22.9	47.5

LATE AND EARLY KILLING FROSTS.

In common with other portions of this country, this state is subject in the crop growing season to occasional depression of temperature down to the frost line. On the average, however, there is immunity from killing frosts for a period of about 170 days. The records of the United States Weather Bureau stations, covering a period of about thirty years, show that the average date of the latest killing frost in the spring has been April 20th, and the earliest in autumn, October 9th. In every season there have been light frosts at later and earlier dates, causing no appreciable damage to vegetation, but extensive injury to staple crops by heavy frost has occurred at very infrequent intervals within the past thirty years. In 1870 Prof. T. S. Parvin wrote as follows: "It has happened but once or twice in the last thirty years that the frost has, over a great extent, seriously injured the corn crop. When the spring is late, the fall is either quite hot or lengthened so as to afford time for the crop to mature." The records covering the period since 1870 confirm this statement. The following tables show the dates on which the latest and earliest frosts have occurred at the United States Weather Bureau stations since their establishment:

DES MOINES FROST DATA.

YEAR.	LATEST KILLING FROST IN SPRING.			EARLIEST KILLING FROST IN AUTUMN.			Number days between killing frosts.
	MONTH.	Day.	Temperature—degrees.	MONTH.	Day.	Temperature—degrees.	
1878	No record	...	.....	September	2	.....	....
1879	April	18	32	September	24	.....	159
1880	April	11	32	November	7	....	210
1881	April	13	32	November	9	.....	210
1882	May	22	.....	November	13	32	175
1883	April	1	32	October	20	.....	202
1884	April	8	32	October	23	.....	198
1885	May	7	.....	October	4	.....	150
1886	April	2	32	October	1	.....	181
1887	April	25	.....	October	25	.....	183
1888	April	20	.....	September	29	.....	162
1889	April	4	32	September	27	.....	176
1890	May	16	.....	September	13	.....	120
1891	May	11	.....	October	5	.....	147
1892	April	29	32	October	9	.....	163
1893	April	23	.....	September	25	.....	155
1894	May	19	.....	October	14	.....	148
1895	May	12	.....	September	30	.....	141
1896	April	3	32	September	28	.....	178
1897	April	19	32	October	29	.....	193
1898	April	4	....	October	14	.....	193
1899	April	16	.....	September	29	.....	166
1900	April	4	.....	October	8	.....	187
1901	April	20	.....	October	4	.....	167
1902	April	4	.....	October	14	.....	193
Average	April	21	.....	October	9	.....	171 days.

DAVENPORT FROST DATA.

YEAR.	LATEST KILLING FROST IN SPRING.		EARLIEST KILLING FROST IN AUTUMN.		Days between frosts.
	MONTH.	Day.	MONTH.	Day.	
1872		...	October	10	....
1873	April	8	October	22	196
1874	April	28	October	12	166
1875	May	6	September	18	135
1876	May	1	October	5	148
1877	April	30	October	11	163
1878	March	28	October	27	212
1879	April	11	October	30	201
1880	April	1	October	4	185
1881	April	14	November	10	209
1882	May	22	November	2	163
1883	May	22	October	3	133
1884	April	22	October	23	182
1885	May	9	October	6	149
1886	April	8	October	1	175
1887	April	26	October	12	169
1888	May	13	October	3	142
1889	April	6	October	6	182
1890	May	6	September	28	145
1891	May	5	October	8	155
1892	April	15	October	19	186
1893	April	13	October	15	184
1894	April	8	October	6	180
1895	May	14	September	30	137
1896	April	8	October	7	181
1897	April	17	October	29	194
1898	April	7	October	23	198
1899	April	16	September	30	167
1900	April	5	November	8	216
1901	April	21	October	4	165
1902	April	15	October	28	195
Average date.	April	21	October	13	174

DUBUQUE FROST DATA.

YEAR.	LATEST KILLING FROST IN SPRING.			EARLIEST KILLING FROST IN AUTUMN.		
	MONTH.	Day.	Temperature degrees.	MONTH.	Day.	Temperature—degrees.
1873	....	....	......	October	20	29
1874	April	17	32	October	13	26
1875	May	2	27	October	12	29
1876	May	1	32	October	15	23
1877	May	1	31	October	30	31
1878	March	18	32	October	22	30
1879	April	5	24	October	14	27
1880	April	15	32	October	17	30
1881	April	1	26	November	3	32
1882	May	2	31	October	19	30
1883	May	5	31	October	1	31
1884	April	21	32	October	23	28
1885	May	11	26	October	6	28
1886	April	8	32	October	1	29
1887	April	16	32	October	12	32
1888	May	13	30	September	28	32
1889	April	6	26	September	27	31
1890	May	6	30	September	28	32
1891	April	12	32	October	16	32
1892	April	15	32	October	23	29
1893	April	23	30	September	27	32
1894	April	8	32	October	7	32
1895	May	14	30	October	9	26
1896	April	8	32	October	18	28
1897	April	20	27	October	17	32
1898	April	7	28	October	15	32
1899	April	16	32	September	29	32
1900	April	9	28	November	4	31
1901	April	21	30	October	4	31
1902	April	15	32	October	14	30
Average	April	19	......	October	12	......

KEOKUK FROST DATA.

YEAR.	LATEST KILLING FROST IN SPRING.		EARLIEST KILLING FROST IN AUTUMN.		Number days between frosts.
	MONTH.	Day.	MONTH.	Day.	
1873	....	....	October	6	....
1874	April	23	October	31	190
1875	March	2	September	18	229
1876	April	2	October	7	187
1877	April	3	November	5	215
1878	March	4	October	19	228
1879	April	13	October	24	193
1880	April	17	October	4	169
1881	April	16	October	24	190
1882	March	22	November	13	235
1883	April	24	October	15	172
1884	April	8	October	23	197
1885	April	8	October	6	166
1886	April	6	October	1	177
1887	April	5	September	29	206
1888	April	20	September	27	160
1889	April	6	September	27	174
1890	April	10	October	19	191
1891	April	7	October	20	195
1892	April	6	October	23	199
1893	April	23	October	15	174
1894	April	12	October	9	179
1895	April	14	September	30	169
1896	April	4	October	20	198
1897	April	19	October	29	192
1898	April	6	October	14	190
1899	April	16	September	29	195

KEOKUK FROST DATA—CONTINUED.

YEAR.	LATEST KILLING FROST IN SPRING.		EARLIEST KILLING FROST IN AUTUMN.		Number days between frosts.
	MONTH.	Day.	MONTH.	Day.	
1900	April	13	November	8	208
1901	April	18	November	3	209
1902	April	8	October	14	188
Average	April		October	15	190

SIOUX CITY FROST DATA.

YEAR.	LATEST KILLING FROST IN SPRING. MONTH.	Day.	EARLIEST KILLING FROST IN AUTUMN. MONTH.	Day.	Number days between frosts.
1889			September	17	
1890	May	7	September	13	129
1891	April	7	October	6	182
1892	May	7	October	8	154
1893	May	3	September	25	145
1894	May	19	September	30	134
1895	May	21	September	27	129
1896	April	19	September	19	153
1897	April	29	September	17	141
1898	April	26	October	6	163
1899	May	4	September	20	139
1900	May	4	September	17	136
1901	April	19	September	17	150
1902	April	23	September	13	143
Averages	May	1	September	23	145

SUNSHINE AND CLOUDINESS.

Iowa enjoys the advantage of a good average amount of sunshine. The mean for the year is 50 to 60 per cent, and this average is maintained in midwinter as well as in midsummer. A distinctive feature of the climate as compared with the eastern states is the large percentage of clear skies in the winter season. The coldest periods in winter are generally cloudless, as a result of the low percentage of humidity during prevalence of north and west winds. For the year the average for the state is as follows: 156 clear, 107 partly cloudy, and 102 cloudy days. The following table shows the yearly averages for the state from 1892 to 1902, inclusive. It will be seen that in the hot and dry years, 1894 and 1901, the number of clear days much exceeded the normal:

YEAR.	No. of clear days.	No. of partly cloudy days.	No of cloudy days.
1892	146	102	117
1893	93	108	164
1894	184	109	72
1895	169	108	88
1896	145	115	105
1897	158	105	102
1898	160	105	100
1899	160	116	89
1900	172	101	92
1901	178	103	84
1902	145	109	111
Average	156	107	102

DESTRUCTIVE STORMS.

Cyclones of the transcontinental type, which move in rapid succession across this central valley and irrigate the larger part of the continent, are moderate in force in comparison with the tropical cyclones or hurricanes that occasionally devastate portions of the Gulf and Atlantic coast. The most severe storms that visit this region are of the minor or local class of disturbances, and their destructive effects are usually limited to narrow tracks and small areas. The earth is watered and made fruitful by the expenditure of tremendous energy in the operation of nature's rain making machinery, and the most destructive storms are incidental ills resulting from conditions which promote the general good. Hailstorms, windsqualls, thunderstorms and tornadoes are exceptional products of the benign elements of heat and moisture which have made this valley a paradise of abundance. There are regions of wide extent, which enjoy well nigh perfect immunity from these severe storms, but they are mostly deserts or arid sections which must be irrigated to yield even a scanty support to their inhabitants.

In Iowa the heaviest damage to crops has been caused by hail, and lightning is the element that causes greatest destruction of human life, farm animals and buildings. Wind squalls have wrought considerable destruction to farm buildings, windmills and frail structures in exposed localities. Tornadoes have caused more general alarm among people at home and abroad, but in reality they have been relatively infrequent, and have caused less real damage than has resulted from ordinary thunderstorms. The area devastated by tornadoes in this state is quite insignificant in comparison with the whole state; in fact, it may be stated that not exceeding one half of one per cent of the entire surface of the state has been swept over by tornadoes within the past half century. There have been scores of windstorms that were miscalled tornadoes in sensational reports, but the real, deadly tornado is an infrequent visitor, and when one comes its path is very narrow. There has been a vast deal of exaggeration in relation to that class of storms.

Gen. A. W. Greeley, chief signal officer of the United States army, in his book on American Weather, said that about three thousand persons in the United States have been killed by tornadoes, and the loss of life has been greatest in the following states, in the relative order named: Missouri, Mississippi, Iowa, Illinois, Minnesota, Wisconsin and Ohio. In his annual report for 1880, General Greeley gave the following estimate of the total area visited annually by violent storms of all classes: In Alabama one square mile of limited destruction to 8,866 square miles of area; Arkansas, 1 to 14,418; Georgia, 1 to 6,696; Illinois, 1 to 8 162; Indiana, 1 to 6,210; Iowa, 1 to 7,164; Kansas, 1 to 9,720; Missouri, 1 to 5,336; Ohio, 1 to 4,554; Wisconsin, 1 to 12,042 miles.

The mean velocity of the wind over this state is about the average for the United States eastward of the one hundredth meridian. The average hourly movement is seven to eight miles. In recent years the force of the wind has been measurably broken, or modified, by artificial timber belts, hedges, etc. The prevailing winds in summer are southerly, and westerly at other seasons.

IS THE CLIMATE PERMANENT?

All records of weather observations in this state for the past fifty years give an affirmative answer to the above inquiry, though there are some who still regard it as an open question. The chief value of records covering considerable periods is that they illustrate not only the seasonal variability but also the permanent conditions of climate. There is as much weight of testimony to sustain the theory that the climate is becoming wetter and cooler as that it is changing towards the opposite extreme. Every table of extremes and means is a prophecy of what may be expected in future years. The constants of temperature, humidity, atmospheric pressure and precipitation appertain as much to the realty of this state as the soil and nether deposits of clay, rock and coal. In fact, it is much easier for man to exhaust these resources of soil and mineral deposits than to cause even the slightest change in its climatic features.

IOWA'S SOIL PRODUCTS.

Iowa's primacy in agriculture is attested by the following statistical tables, compiled from the annual reports of the state Weather and Crop Service for the past thirteen years—1890 to 1902. The first table in the series of crop statistics gives the average yield per acre for each year of the period, and the average amount of rainfall for the state in the four critical months of the crop season, May 1st to September 1st. The second table shows the totals of the staple crops for the state, and the third gives the average farm price of the several products on December 1st in each year of record, with the aggregate value of all soil products. In these figures as to value of crops no account is made of the increment gained by feeding grain and hay to farm animals. The price of corn, oats and hay on December 1st is usually much less than the maximum prices for the year, and much less than the sum usually realized by consuming these crops in the manufacture of beef, pork, mutton, dairy and poultry products, etc. In very many seasons the feeding value of corn has been double the price offered in December, and in all years the sums actually realized have greatly exceeded the farm prices current at close of the harvest.

Corn is foremost, with an average yearly output of 261,200,756 bushels, and an aggregate of 3,395,609,836 bushels in the thirteen year period. The average selling value on the farms, December 1st, has been nearly $70,000,000 yearly. The highest total value for a year's product was $113,000,000 in December, 1901, and the lowest was $36,000,000 in 1894. In four seasons during the period the corn yield has amounted to more than 300,000,000 bushels, viz, in 1891, 1896, 1899 and 1900. In the latter year the product was 345,000,000 bushels, which is the maximum amount for all the years of record, according to the figures compiled by the state crop service. The United States census of 1900, however, credited this state with a total of 383,453,190 in the year 1899, produced on an acreage of 9,804,076 acres. The census figures are of value as evidence that the statistics of the Iowa crop service have been made on a conservative basis as to acreage and average yield. For the past fifteen years the total corn output of Iowa has exceeded any other state in this country, or any other country. Other states have grown more bushels per acre on very small areas; but Iowa is in the lead because it possesses the largest area of farm lands adapted to the production of this great staple. By rotation of crops, it has been possible to produce corn continually on about one-fourth of the area in farms, without exhausting the soil.

The average annual yield of corn has been 31.5 per acre for the state at large. During the past decade the yield per acre has averaged about two bushels higher than in any previous ten-year period; as a result of improved methods in selection and care of seed, preparation of seed bed and cultivation of the crop. The highest yield per acre for the state was harvested in

1900, when the average was 40.3 bushels. In that year May and June received a little less than normal and July considerably above the usual amount; thus giving relatively dry weather for planting and cultivating the fields and copious moisture during the tasseling, earing and filling stage of growth. In 1896 there was dry weather in June and ample rainfall in July for the development of an average crop of 39 bushels per acre. The temperature and rainfall of those critical months determine the output of the corn.

The hay crop ranks second in value and importance, the average yearly amount harvested being about 5,500,000 tons, averaging in value over $30,000,000. The average yield has been about one and a half tons per acre. The total forage products of the state, including cultivated and wild hay, millet, corn stover, straw and pasturage, have been more valuable year by year, than the grain product of the corn crop.

The oats crop fills an important place in the agriculture of the state, the average annual amount being 117,118,000 bushels, valued at over $25,000,000. The range in the average yield has been from 24 to 48 bushels per acre.

The average yearly output of all the cereal crops has been 408,760,000 bushels, valued at $110,541,980 at farm prices on December 1st. This would make the average yearly value of cereals about $485 per farm. The average value of corn per farm has been about $305.

The United States census report for 1900 contained the following important statistics relative to Iowa:

Total number of farms, 228,626.
Number of acres in farms, 34,574,337.
Total acreage improved, 29,897,552.
Value of land and improvements, except buildings, $1,256,751,980.
Value of farm buildings, $240,830,096.
Value of live stock on farms, $278,830,096.
Value of live stock not on farms, $12,714,320.
Value of soil products not fed to stock, $263,383,480.
Value of all farm products, including amount fed to stock, $365,411,528; an average of one million dollars per day.
Average value of products per farm, $1,598.
Average value per acre of products not fed, $7.62.
Value of animals sold and animals slaughtered on farms in 1899, $121,527,461.
Total products of animal industry, $169,858,981.
Value of milk, butter, cheese and eggs, $27,516,870.
Value of eggs produced, $10,016,707.
Value of poultry, $9,491,819.
Products of bees, $305,183.
Value of wool sold, $992,334.
Number of horses in 1900, 1,392,578.
Number of milk cows, 1,423,648.
Number of other cattle, 3,943,[illegible]82.
Number of swine, 9,723,791.
Number of sheep, 657,868.
Number of mules and asses, 57,579.
Value of farm implements and machinery, $57,960,660.
Amount paid for labor on farms, 1899, $16,375,670.

COMPARATIVE STATEMENT.

Value of Live Stock and Farm Products, taken from United States Census Report, 1900.

VALUE OF LIVE STOCK, 1899.

Iowa	$ 240,576,955
Illinois	193,758,037
Kansas	109,956,936
Missouri	160,540,004
Ohio	125,954,616

VALUE OF FARM PRODUCTS, 1899.

Iowa	$ 365,411,528
Illinois	345,649,611
New York	245,570 600
Ohio	257,065,826
Kansas	209,895,542
Texas	239,823,244

CROP STATISTICS—1890-1902.

COMPILED FROM ANNUAL REPORTS OF THE IOWA WEATHER AND CROP SERVICE.

YEAR.	STATE AVERAGES OF FARM CROPS 1890-1902—YIELD PER ACRE.								AVERAGE RAINFALL, INCHES—MAY 1ST TO SEPT. 1ST.				
	Corn, bushels.	Spring wheat, bushels.	Oats, bushels.	Barley, bushels.	Rye, bushels.	Flax, bushels.	Potatoes, bushels.	Hay, tons.	May.	June.	July.	August.	Total.
1890	28	12	29	24	16	10.5	48	1.5	3.56	7.76	1.98	3.41	16.71
1891	38	15	40	29	20	10.7	142	1.7	3.18	5.39	4.22	4.24	17.03
1892	29	12.3	25	24.3	15	8	51	2.0	8.77	5.19	5.29	2.24	21.49
1893	35.7	12.4	24	22.6	16.3	9.1	50.2	1.7	3.45	3.91	3.33	2.32	13.01
1894	14 8	12.8	24	18.4	15.1	8	40.7	0.8	1.87	2.67	.63	1.58	6.75
1895	38	19	48	41	19	11	106	1.3	3.19	4.32	3.40	4 43	15.34
1896	39	13	26	29	16	9.5	87	1.5	6.69	3.11	6.90	3 52	20.22
1897	29	13.4	30	25	15	10	60	1.6	1.92	3.81	3.26	1.80	10.85
1898	34.5	14.8	32	27.5	16	10.5	76	1.7	4.67	4.72	2.98	3.44	15.81
1899	36.3	12.7	34	25 6	16.3	11.2	98	1.5	6.23	5.04	3.07	3.68	18.02
1900	40.3	14.3	35	25.3	15.6	11.7	78	1.4	3.31	3.98	6.15	4.65	18.09
1901	26.2	15.3	32	24.2	15.8	8.8	37.4	1.4	2.35	3.71	2.34	1.29	9.69
1902	34	13	31	25	17	8	91	1 8	5.39	7.16	8.67	6.58	27.80
Averages	32.5	13.8	31.5	26.2	16.4	9.7	73.8	1.5	4.19	4.67	4.02	3.32	16.21

TOTAL YIELD IOWA STAPLE CROPS—1890-1902.

YEAR.	Corn, bushels.	Wheat, bushels.	Oats, bushels.	Rye, bushels.	Barley, bushels.	Flax, bushels.	Potatoes, bushels.	Hay, tons.
1890	239,675,156	19,041,000	80,002,735	1,608,960	3,664,368	2,979,081	8,332,352	5,668,182
1891	335,031,598	27,586,000	115,810,800	2,051,400	4,528,669	3,151,016	25,620,350	7,120,000
1892	173,867,354	7,534,952	83,485,150	1,536,270	14,049,072	5,188,104	8,729,160	6,958,000
1893	214,804,758	11,385,899	100,742,852	1,785,202	11,437,666	2,263,861	6,172,257	7,382,000
1894	129,104,930	9,470,306	107,691,460	1,624,073	8,635,600	1,371,165	7,869,321	3,220,000
1895	285,000,000	14,346,000	201,600,000	2,014,000	18,678,000	2,310,000	21,200,000	3,810,000
1896	312,692,210	10,398,785	73,450,000	1,891,716	15,881,618	1,946,720	14,814,795	5,701,440
1897	239,452,150	14,613,054	132,571,150	3,490,844	14,076,850	2,498,600	10,051,910	5,301,320
1898	289,214,850	22,321,268	139,915,340	3,370,550	14,138,000	2,376,600	12,538,410	5,498,080
1899	306,852,710	19,900,830	140,647,300	2,061,160	14,719,310	1,597,790	15,252,930	5,311,130
1900	345,055,040	21,288,350	138,832,300	1,621,130	12,695,200	1,222,980	10,850.900	5,139,060
1901	227,908,850	18,295,000	114,883,000	859,630	14,654,410	916,890	5,098,460	4,980,380
1902	296,950,230	13,512,840	92,907,900	882,830	15,380,910	755,350	12,051,670	5,641,900
Sums.	3,395,609,836	209,694,284	1,522,540,287	24,797,265	162,539,673	28,578,357	158,582,515	71,732,492
Avgs..	261,200,756	16,130,339	117,118,483	1,907,482	12,503,051	2,182,950	12,198,347	5,517,884

AVERAGE VALUES OF FARM CROPS OF IOWA—DECEMBER 1 PRICES—1890-1902.

YEAR.	CORN.		OATS.		WHEAT.		BARLEY.		RYE.		FLAX.		POTATOES.		HAY.		Value of total soil products.
	Average per bus.	Total value.	Average per bus.	Total value.	Average per bus.	Total value.	Average per bus.	Total value.	Average per bus.	Total value.	Average per bus.	Total value.	Average per bus.	Total value.	Average per ton.	Total value.	
1890	$.41	$ 98,266,810	$.39	$ 30,401,030	$.78	$ 19,589,350	$.47	$ 1,722,250	$.51	$ 820,570	$ 1.10	$ 3,276,980	$.81	$ 6,749,200	$ 6.00	$ 40,140,730	$ 150,375,000
1891	.30	100,509,470	.23	26,636,480	.78	25,741,030	.35	1,811,460	.65	1,333,410	.80	2,523,210	.21	5,380,270	6.25	40,490,340	207,841,890
1892	.32	55,637,550	.27	22,540,990	.58	4,370,270	.50	7,024,530	.44	675,950	.90	1,969,290	.73	6,372,280	5.25	38,698,000	175,727,940
1893	.25	53,701,880	.22	22,163,420	.49	5,460,000	.32	3,669.040	.35	621,820	.86	1,946,920	.66	3,963,880	5.00	32,239,000	161,207,460
1894	.45	36,394,480	.27	26,112,570	.50	5,240,510	.40	3,687,500	.43	668,490	1.20	2,077,780	.65	3,104,470	7.00	22,150,000	121,284,690
1895	.17	48,500,000	.13	26,208,000	.45	6,455,700	.24	4,482,720	.29	584,000	.78	1,801,800	.18	3,816,000	6.00	22,312,500	168,235,420
1896	.14	43,916,900	.12	8,814,000	.57	6,020,000	.20	3,176,320	.25	486,680	.95	1,135,000	.21	2,962,950	4.00	22,782,000	133,664,620
1897	.17	40,706,860	.16	21,211,380	.74	10,813,650	.23	3,237,670	.34	1,186,710	.87	2,173,782	.45	4,523,360	4.10	22,304,000	151,084,060
1898 ...	.23	66,519,400	.21	29,383,220	.53	11,602,000	.30	4,209,740	.38	1,280,800	.80	1,901,280	.31	3,806,900	4.30	22,281,000	187,455,370
1899	.23	70,429,410	.19	26,722,980	.58	10,701,490	.30	4,415,570	.40	824,460	1.04	1,661,890	.24	3,660,710	5.70	29,350,000	194,605,700
1900	.27	93,164,860	.20	27,766,460	.60	12,799,370	.33	4,189,410	.43	697,300	1.50	1,834,470	.40	4,340,360	5.60	31,120,000	229,809,050
1901	.50	113,954,000	.35	40,209,230	.60	10,965,000	.44	6,447,940	.48	859,630	1.29	916,890	.90	4,588,610	7.50	38,712,000	274,080,930
1902	.28	83,432,700	.24	22,297,900	.53	7,062,640	.33	5,075,710	.40	353,132	1.00	725,350	.34	4,095,650	6.00	36,787,320	215,722,330
Sums...		$905,234,220	....	$330,467,660		$136,821,010	...	$ 54,129,860	....	$ 10,392,950	.....	$ 23,944,640	....	$ 57,364,640	......	$399,366,890	$2,377,094,460
Avgs...	$.28	69,633,410	$.23	25,420,590	$.59	10,524,690	$.34	4.163,835	$.41	799,460	$ 1.01	1,841,970	$.45	4,412,660	$ 5.55	30,720.530	182,853,420

PRECIPITATION DATA FOR THE STATE AT LARGE.

The following tables contain precipitation data that will be valuable for reference. Table I shows the averages for the past thirteen years for the state at large. Table II contains the averages of meteorological stations and the counties wherein they are located grouped by districts and showing the district and section averages. The last two columns show the number of years covered by the averages of each station.

TABLE I—MONTHLY AND ANNUAL PRECIPITATION FOR THE STATE, 1890–1903.

YEAR.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.	INCHES.			
														Winter months.	Spring months.	Summer months.	Autumn months.
1890	2.03	0.83	1 57	1.78	3.56	7.76	1.98	3.41	2.97	3.48	1.46	0 45	31.28	3.31	6.91	13.15	7.81
1891	1.75	1.16	2.60	2.15	3 18	5.39	4.22	4 24	1 33	2.77	1.70	2.41	32.90	5.32	7.93	13.85	5 80
1892	1.09	1.20	2.22	4.75	8.77	5.19	5.29	2.24	1.53	1.55	1.10	1.65	36.58	3.94	15.74	12.72	4.18
1893	0.74	1.39	2.14	4.21	3.45	3.91	3.33	2.32	2.34	1.28	1.17	1 31	27.59	3.44	9.80	9.56	4.79
1894	1 09	0.89	2.30	3 07	1 87	2.67	0.63	1.58	3.57	2.67	0.92	0.95	21.91	2.93	7.14	4.88	7.16
1895	0.85	0.49	0.83	2 62	3.19	4.32	3.40	4.43	3.03	0.47	1.51	1.63	26.77	2.97	6.64	12 15	5.01
1896	0.48	0 71	1.10	5.02	6.68	3.11	6.90	3.52	4.09	3.13	1.83	0.65	37.23	1.84	12.81	13.53	9.05
1897	2.01	0.88	2.39	5.35	1.92	3.81	3.26	1 86	2.04	1.14	0.66	1.65	26.97	4.54	9.66	8.93	3.84
1898	1.60	1.20	1.94	2.56	4.67	4.72	2.98	3 44	2.69	3.56	2.50	0 48	31.34	3.28	9.17	11.14	7.75
1899	0.28	0.89	1.62	2.40	6.23	5.04	3 07	3.68	0.93	1.73	1.20	1.61	28.68	2.78	10.25	11.79	3 86
1900	0.53	1.30	2.06	2 67	3 31	3.93	6.15	4 65	4.08	3 91	1.06	0.45	34.15	2.28	8.04	14.78	9.05
1901	0.74	1.01	2.64	1.79	2.35	3.71	2.34	1.29	4.77	1.98	0.86	0.93	24.41	2.68	6.78	7.34	7.61
1902	0.88	0.73	1.45	1.71	5.39	7.16	8.67	6.58	4.35	2.54	2.13	2.23	43.82	3.84	8.55	22.41	9.02
Averages	....	....	....	....	....	....	....	....	....	....	....	....	31.07	3.32	9.19	12.02	6.53

MONTHLY AND ANNUAL PRECIPITATION.

Averages by Districts, Stations and Counties, with Number of Years' Records.

NORTHEAST DISTRICT.

STATION.	COUNTY.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Ann'l.	No. of years.	Period.
Lansing	Allamakee	1.18	1.33	2.43	2.39	4.31	4.09	3.45	3.00	2.97	2.59	1.89	1.18	29.40	7	1896-1902
Waukon	Allamakee	1.50	1.39	2.21	2.34	3.57	4.83	4.90	3.43	4.41	2.27	1.77	1.74	35.24	13	1875-1888
Decorah	Winneshiek	1.08	0.98	1.96	2.69	4.37	4.26	3.21	1.68	3.44	2.34	1.59	1.36	28.97	10	1893-1902
Ridgeway	Winneshiek	1.70	2.67	2.41	2.11	5.15	4.52	5.09	2.70	4.13	3.88	1.95	2.50	38.89	5	1898-1902
Cresco	Howard	1.17	.93	1.69	2.43	3.76	4.96	4.03	2.85	3.69	2.37	1.39	1.29	30.43	32	1871-1902
New Hampton	Chickasaw	.83	1.07	1.65	1.93	4.47	4.48	3.69	2.50	3.75	2.55	1.79	0.67	29.67	6	1897-1902
Waverly	Bremer	.93	1.12	1.96	3.04	4.62	4.48	3.84	2.53	3.20	2.64	1.48	1.08	31.09	7	1896-1902
Fayette	Fayette	1.23	1.16	2.26	3.20	4.84	5.85	3.70	2.90	2.96	2.81	1.65	1.43	33.79	13	1890-1902
Clermont	Fayette	1.14	.84	1.61	2.29	4.32	4.30	4.15	2.39	3.43	2.05	1.47	1.28	29.90	26	1877-1902
Elkader	Clayton	1.35	1.12	1.83	2.85	4.05	4.20	4.34	2.80	3.82	2.75	1.68	1.93	32.72	23	1877-1902
Grand Meadow	Clayton	1.18	1.12	2.10	3.13	5.15	5.26	4.32	2.50	3.17	2.57	1.59	1.56	33.65	12	1891-1902
McGregor	Clayton	1.38	1.14	1.95	2.58	4.06	4.94	4.54	2.86	3.76	2.65	1.47	1.63	33.32	27	1876-1902
Averages		1.22	1.26	2.01	2.58	4.39	4.68	3.94	2.68	3.56	2.62	1.72	1.47	32.25	15	

NORTH CENTRAL DISTRICT.

STATION.	COUNTY.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Ann'l.	No. of years.	Period.
Osage	Mitchell	.88	1.18	1.57	2.57	4.23	4.52	3.54	3.00	3.50	2.43	1.45	1.28	30.18	15	1880-1902
Northwood	Worth	.65	1.16	1.60	2.31	4.42	4.81	3.99	3.62	3.49	2.63	1.56	.91	30.70	7	1896-1902
Forest City	Winnebago	.64	.77	1.48	2.60	3.80	5.06	3.43	2.21	3.82	2.37	1.36	.91	29.42	9	1894-1902
Algona	Kossuth	.30	1.30	1.56	2.56	3.45	4.39	3.67	3.71	3.16	2.10	1.26	1.05	29.51	30	1861-1902
Estherville	Emmet	.35	.62	1.41	2.46	3.13	3.09	3.88	3.30	3.10	1.62	1.17	.59	24.72	8	1895-1902
West Bend	Palo Alto	.62	.81	1.64	2.81	2.84	3.81	3.84	3.63	3.18	1.76	1.39	.99	27.32	10	1893-1902
Britt	Hancock	.59	.97	1.34	2.07	3.69	4.48	4.32	3.67	4.05	2.18	.98	.79	29.13	6	1897-1902
Mason City	Cerro Gordo	1.19	.56	1.34	3.34	3.95	7.04	2.79	2.66	1.85	2.01	1.00	.66	28.39	6	1894-1900
Charles City	Floyd	1.11	1.22	1.75	2.90	4.13	5.11	3.23	2.93	2.87	2.04	1.49	1.29	30.07	12	1891-1902
Greene	Butler	.71	.96	1.64	1.88	4.14	4.07	4.19	3.15	3.34	2.14	1.29	.98	28.49	6	1897-1902
Hampton	Franklin	1.10	1.11	2.26	3.44	4.17	5.23	4.14	3.15	3.50	2.63	1.61	1.32	33.66	13	1890-1902
Dows	Wright	.54	.90	1.99	3.05	5.07	5.08	4.35	3.88	3.77	2.35	2.34	.89	33.21	7	1896-1902
Humboldt	Humboldt	.65	.70	1.45	2.74	3.88	4.67	3.94	3.11	3.44	1.73	1.46	.76	28.53	15	1887-1902
Plover	Pocahontas	.51	.65	1.38	1.78	3.28	4.03	5.13	4.00	4.04	2.31	1.59	.75	28.29	7	1896-1902
Averages		.70	92	1.60	2.61	3.87	4.67	3.96	3.29	3.36	2.16	1.42	.95	29.40	10.7	

NORTHWEST DISTRICT.

Spirit Lake	Dickinson	.51	.55	.80	1.72	3.85	5.88	4.40	4.01	5.71	1.35	.57	1.15	30.50	4	1899-1902
Sibley	Osceola	.54	.47	1.17	2.69	3.35	4.13	3.91	3.25	3.16	1.67	.87	.86	26.07	10	1893-1902
Rock Rapids	Lyon	.63	.14	1.59	3.75	3.39	3.74	2.52	1.76	2.30	1.75	.99	.61	23.17	6	1893-1898
Sioux Center	Sioux	.27	.78	1.25	3.13	3.82	4.30	5.38	4.10	4.38	1.56	.57	.83	30.37	4	1899-1902
Primghar	O'Brien	.42	.42	2.33	2.82	3.07	4.31	5.13	2.44	2.22	1.68	.97	.42	26.88	8	1895-1902
Sheldon	O'Brien	.39	.68	.96	1.48	3.62	4.17	6.85	3.42	4.09	2.00	.71	.90	27.27	4	1899-1902
Spencer	Clay	.40	.48	1.07	2.70	3.75	5.63	3.18	3.05	2.55	2.58	1.95	.47	27.20	5	1895-1899
Alta	Buena Vista	.65	.75	1.82	3.24	4.22	5.66	4.71	3.84	2.67	2.17	1.17	1.03	31.93	12	1891-1902
Storm Lake	Buena Vista	.70	.65	1.38	2.30	3.52	4.88	4.28	2.92	3.02	1.76	.96	.93	27.23	15	1886-1902
Larrabee	Cherokee	.57	.75	1.65	2.99	3.95	5.90	4.66	3.34	2.88	1.84	.98	1.07	30.64	13	1890-1902
Washta	Cherokee	.41	.62	1.25	1.73	3.21	4.41	5.10	2.91	3.91	1.97	1.05	1.17	27.97	5	1898-1902
LeMars	Plymouth	.69	.61	1.37	3.62	3.59	4.02	4.90	2.71	3.19	1.85	1.06	1.09	23.70	7	1896-1902
Averages	Northwest district	.51	.57	1.38	2.68	3.52	4.70	4.58	3.15	3.32	1.85	.99	.87	28.16	7.5	
Averages	* Northern section	.81	.89	1.66	2.62	3.92	4.68	4.18	3.05	3.41	2.21	1.36	1.35	29.91	11	

* Thirty-eight stations of observation.

WEST CENTRAL DISTRICT.

Sac City	Sac	.95	.82	1.65	2.99	3.63	4.89	3.81	3.36	3.29	2.56	1.11	1.15	30.21	26	1876-1902
Grant City	Sac	52	.66	1.72	2.30	3.66	4.45	3.88	3.70	4.10	1.95	1.44	1.04	29.28	17	1869-1888
Odebolt	Sac	.32	.75	1.99	2.71	2.77	4.31	5.12	3.69	3.15	2.21	1.12	1.10	28.78	6	1897-1902
Galva	Ida	.35	.47	1.39	2.76	3.30	4.23	4.20	3.34	4.00	1.67	1.33	.84	31.01	10	1893-1902
Sioux City	Woodbury	.54	.54	1.16	2.84	3.52	3.83	3.40	2.89	2.37	1.62	.77	.89	24.61	14	1889 1902
Onawa	Monona	1.14	.95	1.53	2.99	4.38	5.20	4.63	3.89	2.77	2.39	1.13	1.08	32.07	24	1879-1902
Denison	Crawford	.56	.64	1.63	3.96	3.60	3.58	4.32	3.38	3.21	2.41	.90	.60	29.88	9	1893-1902
Carroll	Carroll	.86	1.08	2.35	3.52	4.41	4.83	3.90	3.77	3.12	2.26	1.15	1.08	32.17	13	1890 1902
Hamlin	Audubon	.57	.56	.85	1.56	3.31	3.49	3.84	2.38	2.55	2.59	.85	.84	23.39	12	1877-1888
Audubon	Audubon	66	.80	1.78	1.92	3.92	3.77	3.92	3.95	3.06	2.23	1.48	1.25	28.64	10	1893-1902
Panama	Shelby	.36	.59	1.35	4.11	4.26	3.51	3.88	4.11	2.34	1.59	1.38	1.04	28.50	6	1891-1896
Logan	Harrison	1.12	1.20	1.90	2.87	4.19	5.70	4.91	3.86	3.11	2.48	1.16	1.35	33.80	37	1866-1902
Averages	West Central District	.66	.76	1.61	2.83	3.75	4.32	4.15	3.53	3.09	2.16	1.15	1.02	29.36	15	

CENTRAL DISTRICT.

Grundy Center	Grundy	.71	.72	1.66	3.38	4.95	5.84	4.18	3.57	3.32	2.69	1.28	1.25	33.58	12	1891-1902
Iowa Falls	Hardin	.84	.95	1.61	3.15	3.55	4.77	3.84	3.40	3.22	2.30	1.28	1.16	29.86	10	1893-1902
Webster City	Hamilton	1.11	1.05	1.96	3.81	3.22	3.30	3.72	2.85	1.51	2.10	1.10	1.56	27.28	5	1891-1897
Rockwell City	Calhoun	.63	.51	2.30	2.41	3.34	4.50	4.00	3.54	3.07	2.58	.85	1.30	28.13	7	1894-1902
Ogden	Boone	.59	.59	1.52	2.95	5.16	4.48	4.12	4.06	3.80	2.66	1.11	1.01	32.45	9	1894-1902
Ames I. S. C.	Story	.97	.84	1.48	2.75	4.23	4.75	4.58	3.54	3.53	2.52	1.10	1.02	31.29	27	1876-1902
Albion	Marshall	.91	1.89	2.17	2.04	4.18	5.11	4.54	3.02	4.40	3.17	1.84	1.18	34.22	7	1878-1884
Marshalltown	Marshall	.94	.78	1.93	3.11	4.74	4.94	4.45	3.57	2.67	2.47	1.33	1.48	32.40	11	1891-1902

MONTHLY AND ANNUAL PRECIPITATION—CONTINUED.

CENTRAL DISTRICT—CONTINUED.

STATION.	COUNTY.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Ann'l.	No. of years.	Period.
Toledo	Tama	.81	.69	1.75	3.03	3.71	3.60	3.23	3.82	3.11	1.87	1.53	1.14	28.29	9	1894-1902
Dysart	Tama	1.24	1.20	1.73	2.11	3.89	4.97	4.75	3.80	4.70	3.13	1.79	1.68	34.30	14	1876-1889
Grinnell	Poweshiek	1.16	.87	1.79	3.52	4.65	4.89	3.72	3.66	2.46	2.45	1.52	1.29	31.98	13	1890-1902
Newton	Jasper	.92	1.02	1.56	3.38	4.46	4.97	3.88	3.87	3.23	2.77	1.80	1.33	33.39	16	1878-1902
Des Moines	Polk	1.23	1.11	1.56	2.95	4.60	5.07	3.70	3.48	3.09	2.85	1.50	1.38	32.52	25	1878-1902
Guthrie Center	Guthrie	.53	.67	1.40	2.47	4.57	4.06	4.54	4.56	3.46	2.22	1.05	1.27	33.54	8	1895-1902
Averages	Central District	.90	.92	1.74	2.93	4.23	4.66	4.09	3.62	3.26	2.56	1.36	1.29	31.66	12	

EAST CENTRAL DISTRICT.

STATION.	COUNTY.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Ann'l.	No. of years.	Period.
Dubuque	Dubuque	1.58	1.48	2.22	2.94	4.29	4.78	4.15	2.92	3.96	2.59	1.88	1.69	34.43	30	1874-1902
Hopkinton	Delaware	1.20	1.11	.76	2.58	3.59	3.60	3.98	3.59	4.25	2.27	1.44	1.30	29.67	30	1869-1898
Delaware	Delaware	1.01	.88	1.83	3.04	4.12	4.28	3.68	2.86	3.24	2.22	1.61	1.52	30.29	12	1891-1902
Independence	Buchanan	1.37	1.05	1.79	2.21	4.17	5.03	4.72	3.43	4.70	2.37	1.52	1.48	33.84	36	1867-1902
Waterloo	Black Hawk	.95	.98	1.83	2.99	4.33	4.50	4.24	3.60	3.49	2.32	1.40	1.14	31.82	8	1895-1902
Cedar Falls	Black Hawk	1.12	.93	1.42	3.32	4.86	3.80	3.95	2.90	2.78	2.52	1.31	1.02	29.93	9	1891-1899
Vinton	Benton	1.15	1.01	1.78	2.92	3.95	3.98	3.39	2.61	2.79	1.60	1.15	1.21	28.27	13	1890-1902
Belle Plaine	Benton	1.52	1.30	2.60	3.61	4.44	4.23	3.64	4.36	2.90	2.28	1.83	1.49	33.53	13	1890-1902
Mount Vernon	Linn	1.31	1.07	2.03	3.03	4.09	3.75	4.63	4.57	2.81	2.40	1.12	1.66	32.47	7	1896-1902
Cedar Rapids	Linn	1.44	1.55	2.18	2.98	4.52	3.92	3.87	3.25	2.89	2.59	1.42	1.61	32.22	21	1882-1902
Monticello	Jones	1.54	1.60	2.39	2.69	3.91	4.49	4.16	3.55	3.72	2.72	2.14	2.21	35.12	48	1855-1902
Olin	Jones	1.08	1.33	2.45	2.18	4.52	3.52	3.60	3.58	3.38	2.42	1.20	1.46	30.78	5	1898-1902
Maquoketa	Jackson	1.32	1.50	2.29	2.53	4.53	5.72	4.09	2.83	3.21	2.94	1.45	1.61	33.14	10	1890-1902
Clinton	Clinton	1.85	2.11	3.02	2.93	4.60	4.68	4.09	3.05	3.10	2.41	1.90	1.81	33.55	32	1866-1902
Davenport	Scott	1.66	1.59	2.24	2.71	4.33	4.14	3.64	3.61	3.06	2.42	1.89	1.63	32.92	32	1871-1902
Muscatine	Muscatine	1.01	2.08	2.79	3.41	4.38	4.86	3.91	4.38	3.72	3.04	2.30	2.28	38.16	46	1846-1891
Wilton	Muscatine	1.38	1.40	2.71	2.87	4.32	3.28	5.27	4.21	3.18	2.07	1.80	1.45	30.80	8	1895-1902
Mechanicsville	Cedar	1.40	1.13	2.15	2.99	4.30	4.40	3.52	2.08	2.95	1.34	1.62	1.76	30.79	5	1892-1896
Iowa City	Johnson	1.74	1.51	2.48	3.14	4.34	4.63	4.50	4.26	3.83	2.54	2.82	1.66	36.95	41	1857-1903
Amana	Iowa	1.44	1.27	2.00	2.88	4.46	4.49	4.20	3.58	3.36	2.74	1.75	1.49	33.48	27	1876-1903
Averages	East Central District	1.35	1.34	2.15	2.90	4.30	4.30	4.06	3.46	3.37	2.39	1.65	1.57	32.61	21	
Averages	*Central Section	1.03	1.06	1.88	2.90	4.09	4.42	4.09	3.53	3.26	2.38	1.43	1.34	31.47	17	

SOUTHEAST DISTRICT.

Wapello	Louisa	.71	1.46	2.52	2.24	3.59	2.92	3.09	5.25	2.92	2.22	1.46	1.34	29.95	4½	1898-1902
Washington	Washington	1.45	1.16	2.17	2.62	3.43	2.45	3.54	3.49	2.62	2.13	1.39	1.47	29.92	13	1890-1902
Sigourney	Keokuk	1.24	1.35	1.89	3.60	3.98	3.69	6.34	3.73	2.97	3.02	1.50	1.41	36.73	7	1896-1902
Ottumwa	Wapello	1.59	1.24	1.91	3.08	4.82	3.79	4.29	3.68	4.32	2.88	1.68	1.37	34.52	9	1894-1902
Fairfield	Jefferson	1.36	1.38	2.03	3.17	4.30	4.55	3.34	3.77	3.17	2.68	1.68	1.38	32.81	25	1876-1902
Brookville	Jefferson	1.26	1.26	1.99	3.06	3.83	4.97	2.82	3.39	3.00	2.95	1.77	1.62	32.24	13	1876-1888
Mt Pleasant	Henry	1.23	1.04	2.33	3.05	4.34	4.21	3.74	3.91	3.36	2.08	1.59	1.21	31.77	9	1894-1902
Keokuk	Lee	1.80	1.65	2.33	3.19	4.27	4.49	4.21	3.04	3.73	2.67	3.00	1.76	35.35	32	1871-1902
Ft. Madison	Lee	1.89	1.96	2.98	3.29	4.86	4.34	4.11	3.66	3.79	2.75	2.16	2.00	37.79	54	1848-1902
Keosauqua	Van Buren	.92	1.42	2.48	3.84	4.34	4.06	3.97	3.49	4.48	1.90	1.63	1.54	34.07	11	1892-1902
Bonaparte	Van Buren	1.57	1.24	2.68	3.33	4.03	4.34	3.60	3.83	4.01	1.82	2.00	1.45	33.80	12	1891-1902
Belknap	Davis	1.78	1.89	1.53	2.04	2.98	3.96	4.04	4.66	4.14	3.65	2.18	1.98	34.86	8	1895-1902
Averages	Southeast District	1.40	1.42	2.24	3.04	4.06	3.98	3.92	3.82	3.54	2.56	1.84	1.54	33.65	16	

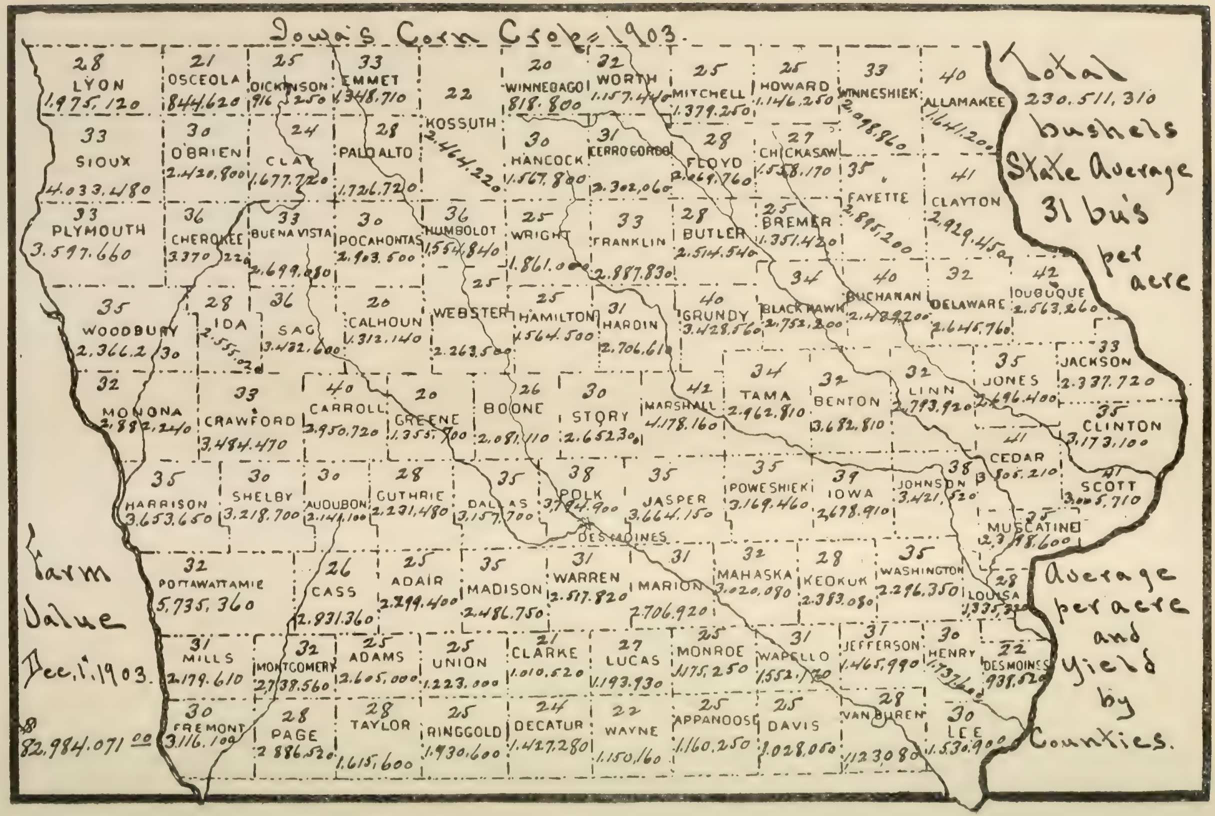
SOUTH CENTRAL DISTRICT.

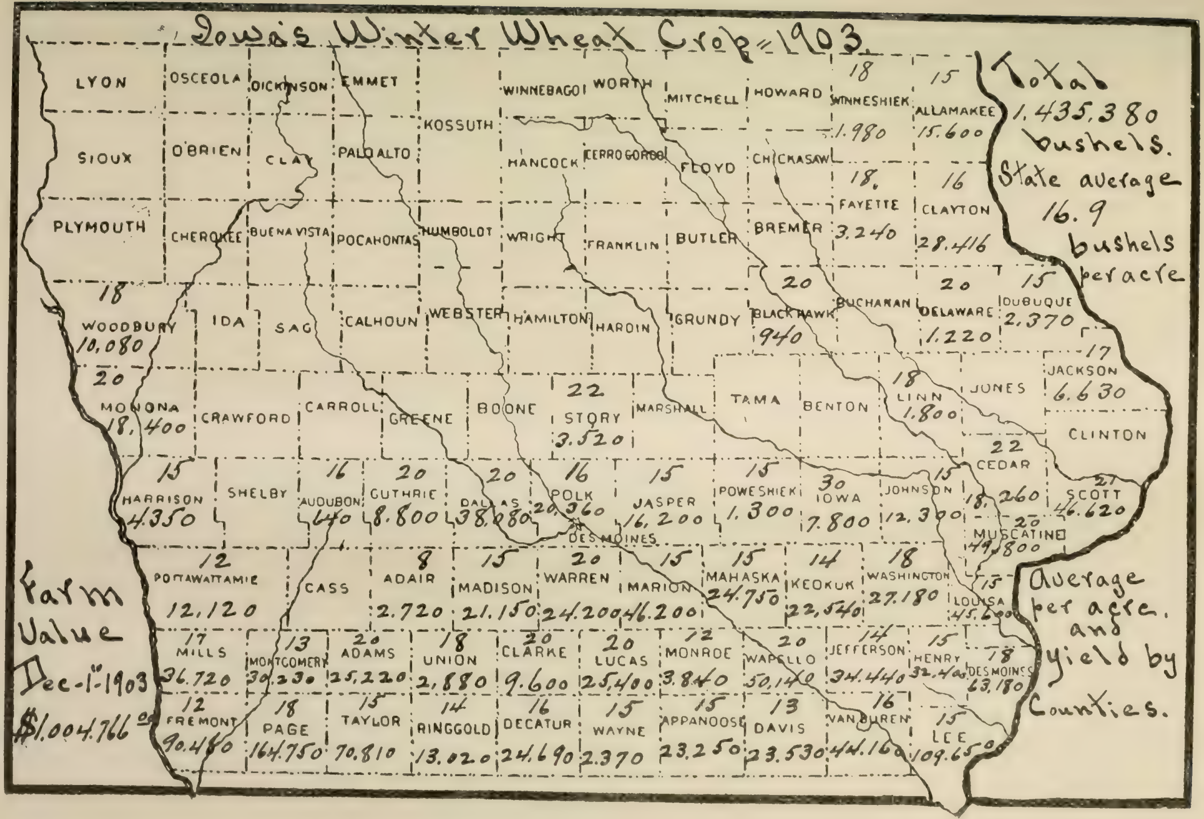
Oskaloosa	Mahaska	.88	1.07	1.89	2.78	3.57	4.13	4.05	3.14	3.10	2.33	1.55	1.26	29.77	27	1876-1902
Knoxville	Marion	.93	.98	1.50	3.16	3.36	3.82	4.46	4.52	3.51	2.40	1.04	1.36	31.04	10	1893-1902
Indianola	Warren	1.15	.75	1.19	3.28	4.70	4.08	3.64	4.16	3.05	2.06	1.30	1.41	30.77	13	1890-1902
Winterset	Madison	.94	.89	2.04	3.66	4.57	5.84	5.93	3.54	3.35	2.37	1.21	1.37	35.71	12	1891-1902
Greenfield	Adair	.90	1.04	2.24	3.13	4.60	5.11	4.89	2.82	3.28	2.30	1.06	1.35	32.72	12	1891-1902
Afton	Union	.81	1.04	2.30	3.67	4.71	4.30	4.80	3.51	3.87	2.96	1.11	1.28	34.36	9	1894-1902
Osceola	Clarke	1.26	1.08	1.88	3.52	5.07	4.28	5.14	3.19	4.18	3.07	1.49	1.27	31.43	9	1894-1902
Hopeville	Clarke	.90	.77	1.68	3.42	4.76	4.35	4.62	3.29	3.53	2.43	.98	1.11	31.84	12	1891-1902
Chariton	Lucas	1.11	1.04	1.50	3.49	4.27	4.27	6.24	2.90	3.73	2.82	1.41	1.52	34.30	8	1895-1902
Maxon	Monroe	.63	1.28	1.67	3.43	5.16	3.42	4.20	4.87	2.62	1.55	1.78	1.97	32.58	6	1891-1896
Centerville	Appanoose	.91	1.22	1.55	3.68	3.58	3.70	3.38	3.98	2.33	1.87	1.33	2.39	28.92	10	1892-1902
Ovid	Wayne	1.61	1.42	2.07	3.12	4.97	4.33	4.40	4.01	3.86	2.87	1.50	1.62	35.78	10	1893-1902
Mt. Ayr	Ringgold	1.03	1.16	1.93	3.15	5.39	4.44	5.11	3.32	3.17	2.39	1.28	1.32	33.69	10	1892-1902
Averages	South Central District	1.00	1.00	1.80	3.35	4.52	4.31	4.68	3.65	3.35	2.42	1.31	1.48	32.53	11.4	

SOUTHWEST DISTRICT.

Atlantic	Cass	.76	.96	1.96	3.04	4.17	5.68	4.35	3.06	2.67	2.64	.86	1.38	31.53	12	1891-1902
Council Bluffs	Pottawattamie	.69	1.00	1.53	2.51	4.45	5.38	4.81	3.45	3.30	3.04	1.10	.96	32.25	25	1871-1902
Glenwood	Mills	.85	.68	1.26	2.55	4.49	3.91	3.66	3.51	2.13	2.58	.60	.78	28.69	17	1880-1902
Red Oak	Montgomery	.72	.78	2.26	2.84	3.74	5.16	4.80	3.09	2.96	3.20	1.04	1.22	31.91	6	1897-1902
Villisca	Montgomery	.62	1.05	2.43	3.41	4.15	4.99	5.11	3.82	2.89	2.77	1.08	1.37	32.09	10	1893-1902
Corning	Adams	.75	.80	1.75	3.09	4.73	4.19	4.47	3.40	2.48	2.56	.96	1.24	30.42	11	1892-1902
Lenox	Taylor	.63	.65	1.85	3.02	4.71	4.13	5.22	3.60	2.97	2.99	1.13	1.28	32.62	8	1895-1902
Clarinda	Page	.97	1.02	1.90	3.31	4.79	5.11	4.68	3.71	2.56	2.79	1.03	1.24	32.22	13	1890-1902
College Springs	Page	.56	.90	1.85	3.67	4.94	4.43	5.73	3.44	2.46	3.11	1.04	1.59	33.72	12	1891-1902
Thurman	Fremont	.71	1.32	1.78	3.44	4.71	7.54	5.48	5.43	3.21	4.04	1.09	1.78	40.53	7	1897-1902
Averages	Southwest District	.73	.92	1.86	3.09	4.49	5.05	4.83	3.65	2.76	2.97	.99	1.28	32.60	12	
Averages	*Southern Section	1.06	1.14	1.97	3.11	4.35	4.41	4.46	3.70	3.25	2.63	1.40	1.16	32.93	13.3	
Averages	State	.97	1.04	1.84	2.89	4.13	4.50	4.23	3.43	3.30	2.40	1.40	1.29	31.40	14	

*Thirty-five stations.


Iowa's Corn Crop=1903.
Total 230.511,310 bushels
State Average 31 bu's per acre
Average per acre and Yield by Counties.
Farm Value Dec. 1, 1903. $82,984,071.00
28 LYON 1,975,120
21 OSCEOLA 844,620
25 DICKINSON 916,250
33 EMMET 1,348,710
22 KOSSUTH 2,464,220
20 WINNEBAGO 818,800
22 WORTH 1,157,440
25 MITCHELL 1,379,250
25 HOWARD 1,146,250
33 WINNESHIEK 2,098,860
40 ALLAMAKEE 1,641,200
33 SIOUX 4,033,480
30 O'BRIEN 2,420,800
24 CLAY 1,677,720
28 PALO ALTO 1,726,720
30 HANCOCK 1,567,800
31 CERRO GORDO 2,302,060
28 FLOYD 2,269,760
27 CHICKASAW 1,558,170
35 FAYETTE 2,895,200
41 CLAYTON 2,929,450
33 PLYMOUTH 3,597,660
36 CHEROKEE 3,370,220
33 BUENA VISTA 2,699,080
30 POCAHONTAS 2,903,500
36 HUMBOLDT 1,554,840
25 WRIGHT 1,861,000
33 FRANKLIN 2,887,830
28 BUTLER 2,514,540
25 BREMER 1,351,420
34 BLACK HAWK 2,752,200
40 BUCHANAN 2,489,200
32 DELAWARE 2,645,760
42 DUBUQUE 2,563,260
35 WOODBURY 2,366,230
28 IDA 2,555,020
36 SAC 3,432,600
20 CALHOUN 1,312,140
25 WEBSTER 2,263,500
25 HAMILTON 1,564,500
31 HARDIN 2,706,610
40 GRUNDY 3,428,560
34 TAMA 2,962,810
32 BENTON 3,682,810
32 LINN 2,793,920
35 JONES 2,496,400
33 JACKSON 2,337,720
32 MONONA 2,882,240
33 CRAWFORD 3,484,470
40 CARROLL 2,950,720
20 GREENE 1,355,700
26 BOONE 2,081,110
30 STORY 2,652,300
42 MARSHALL 4,178,160
35 CLINTON 3,173,100
41 CEDAR 805,210
38 JOHNSON 3,421,520
39 IOWA 2,678,910
35 POWESHIEK 3,169,460
35 JASPER 3,664,150
38 POLK 3,794,900
DES MOINES
35 DALLAS 3,157,700
28 GUTHRIE 2,231,480
30 AUDUBON 2,141,100
30 SHELBY 3,218,700
35 HARRISON 3,653,650
41 SCOTT 3,005,710
25 MUSCATINE 2,398,600
32 POTTAWATTAMIE 5,735,360
26 CASS 2,931,360
25 ADAIR 2,299,400
35 MADISON 2,486,750
31 WARREN 2,517,820
31 MARION 2,706,920
32 MAHASKA 3,020,080
28 KEOKUK 2,383,080
35 WASHINGTON 2,296,350
28 LOUISA 1,335,320
31 MILLS 2,179,610
32 MONTGOMERY 2,738,560
25 ADAMS 2,605,000
25 UNION 1,223,000
21 CLARKE 1,010,520
27 LUCAS 1,193,930
25 MONROE 1,175,250
31 WAPELLO 1,552,170
37 JEFFERSON 1,465,990
30 HENRY 1,737,600
22 DES MOINES 938,520
30 FREMONT 3,116,100
28 PAGE 2,886,520
28 TAYLOR 1,615,600
25 RINGGOLD 1,930,600
24 DECATUR 1,427,280
22 WAYNE 1,150,160
25 APPANOOSE 1,160,250
25 DAVIS 1,028,050
28 VAN BUREN 1,123,080
30 LEE 1,530,900



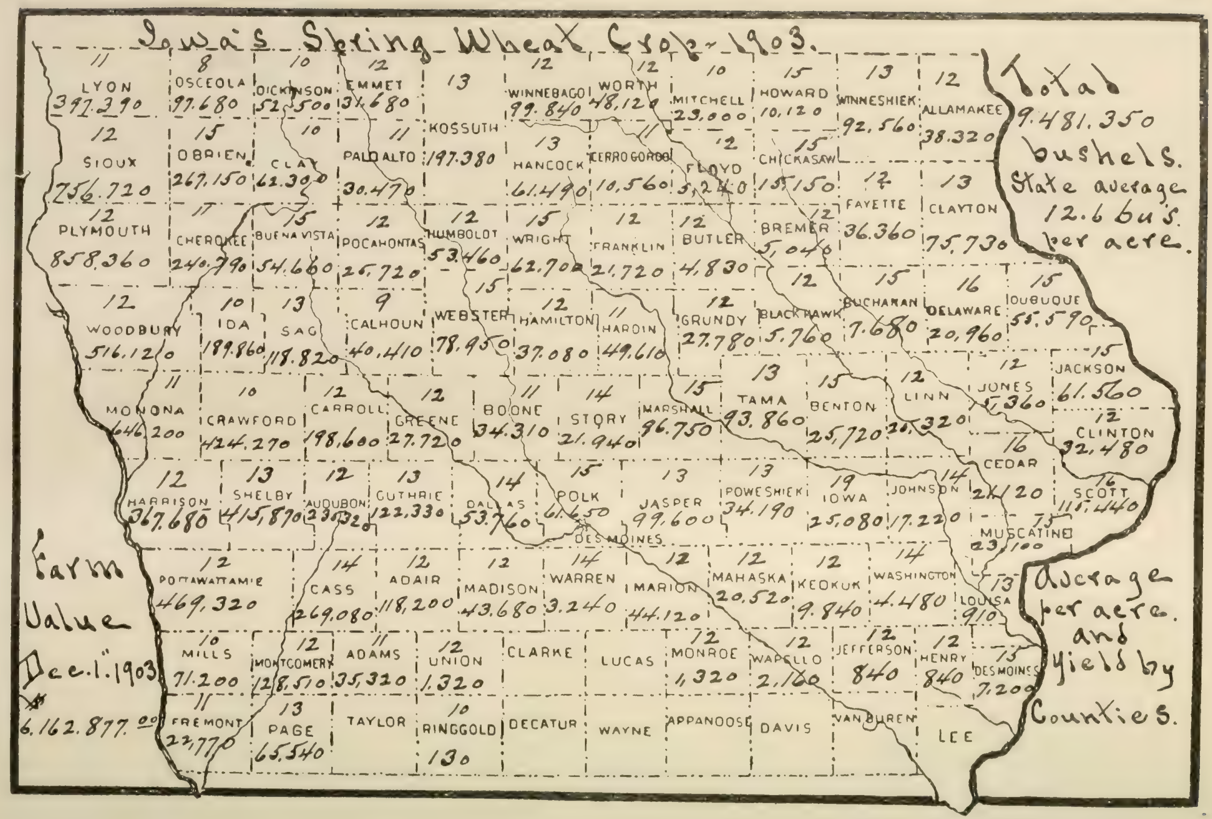
Iowa's Winter Wheat Crop 1903.

Total 1,435,380 bushels. State average 16.9 bushels per acre

Average per acre and yield by Counties.

Farm Value Dec-1st-1903 $1,004,766.00

LYON
OSCEOLA
DICKINSON
EMMET
WINNEBAGO
WORTH
MITCHELL
HOWARD
18 WINNESHIEK 1,980
15 ALLAMAKEE 15,600
SIOUX
O'BRIEN
CLAY
PALO ALTO
KOSSUTH
HANCOCK
CERRO GORDO
FLOYD
CHICKASAW
18 FAYETTE 3,240
16 CLAYTON 28,416
PLYMOUTH
CHEROKEE
BUENA VISTA
POCAHONTAS
HUMBOLDT
WRIGHT
FRANKLIN
BUTLER
BREMER
18 WOODBURY 10,080
IDA
SAC
CALHOUN
WEBSTER
HAMILTON
HARDIN
GRUNDY
20 BLACK HAWK 940
BUCHANAN
20 DELAWARE 1,220
15 DUBUQUE 2,370
17 JACKSON 6,630
20 MONONA 18,400
CRAWFORD
CARROLL
GREENE
BOONE
22 STORY 3,520
MARSHALL
TAMA
BENTON
18 LINN 1,800
JONES
CLINTON
22 CEDAR 260
21 SCOTT 46,620
15 HARRISON 4,350
SHELBY
16 AUDUBON 640
20 GUTHRIE 8,800
20 DALLAS 38,080
16 POLK 20,360
DES MOINES
15 JASPER 16,200
15 POWESHIEK 1,300
30 IOWA 7,800
15 JOHNSON 12,300
18
20 MUSCATINE 49,800
12 POTTAWATTAMIE 12,120
CASS
8 ADAIR 2,720
15 MADISON 21,150
20 WARREN 24,200
15 MARION 46,200
15 MAHASKA 24,750
14 KEOKUK 22,540
18 WASHINGTON 27,180
15 LOUISA 45,600
17 MILLS 36,720
13 MONTGOMERY 30,230
20 ADAMS 25,220
18 UNION 2,880
20 CLARKE 9,600
20 LUCAS 25,400
72 MONROE 3,840
20 WAPELLO 50,140
14 JEFFERSON 34,440
15 HENRY 32,400
18 DES MOINES 63,180
12 FREMONT 90,480
18 PAGE 164,750
15 TAYLOR 70,810
14 RINGGOLD 13,020
16 DECATUR 24,690
15 WAYNE 2,370
15 APPANOOSE 23,250
13 DAVIS 23,530
16 VAN BUREN 44,160
15 LEE 109,650



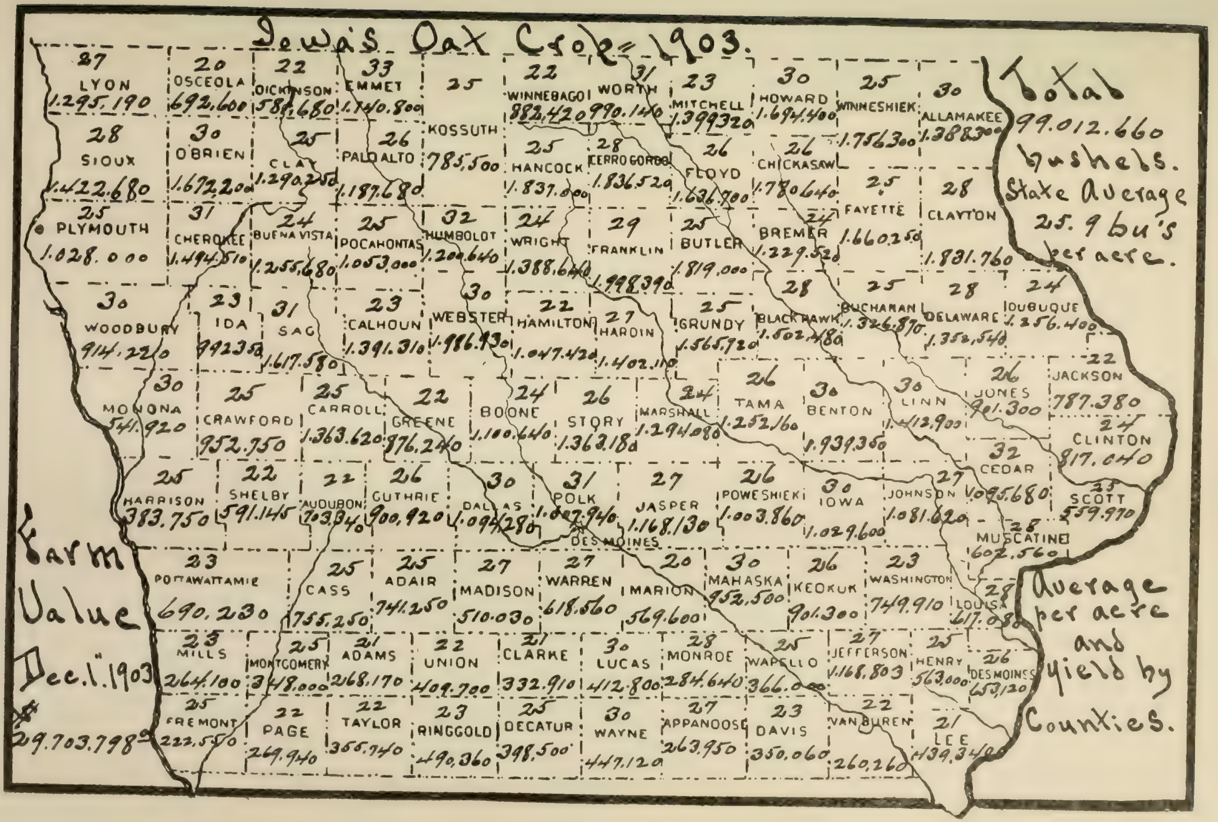
Iowa's Spring Wheat Crop 1903.

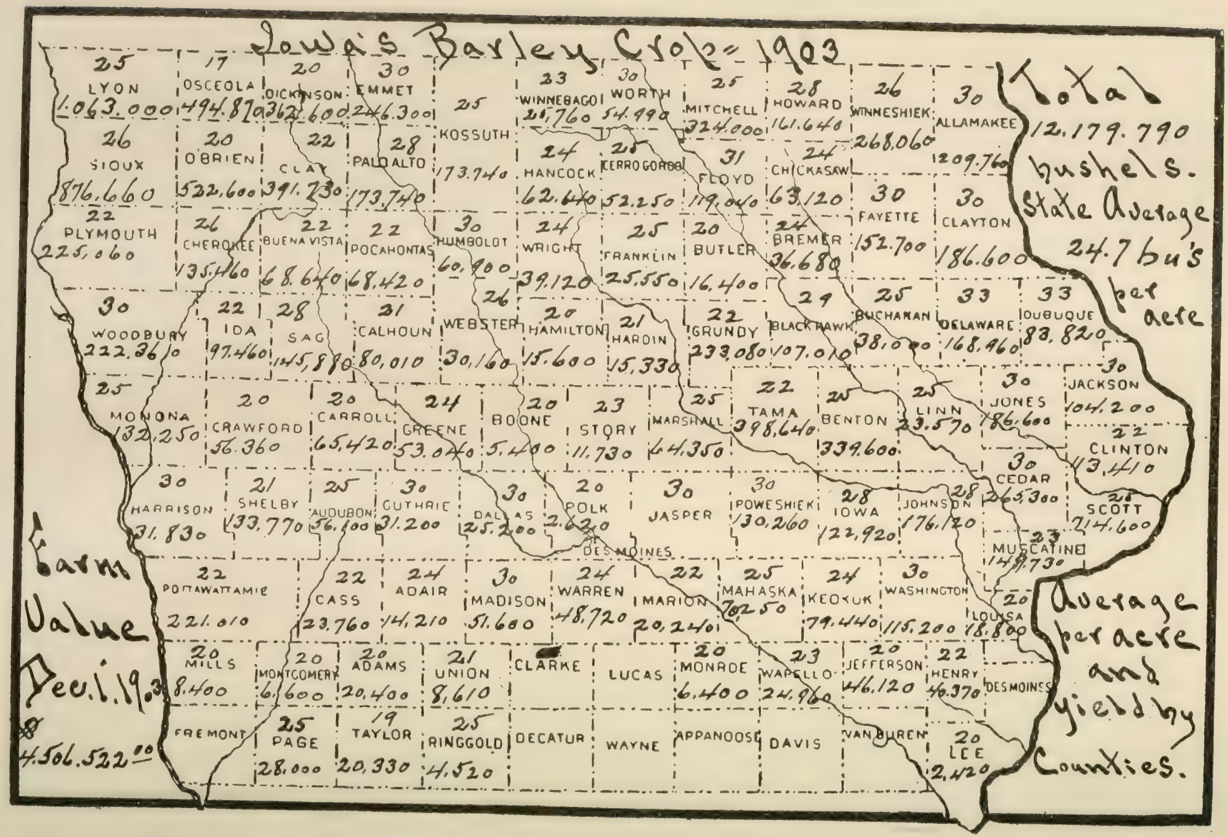
Total 9.481.350 bushels. State average 12.6 bu's. per acre.

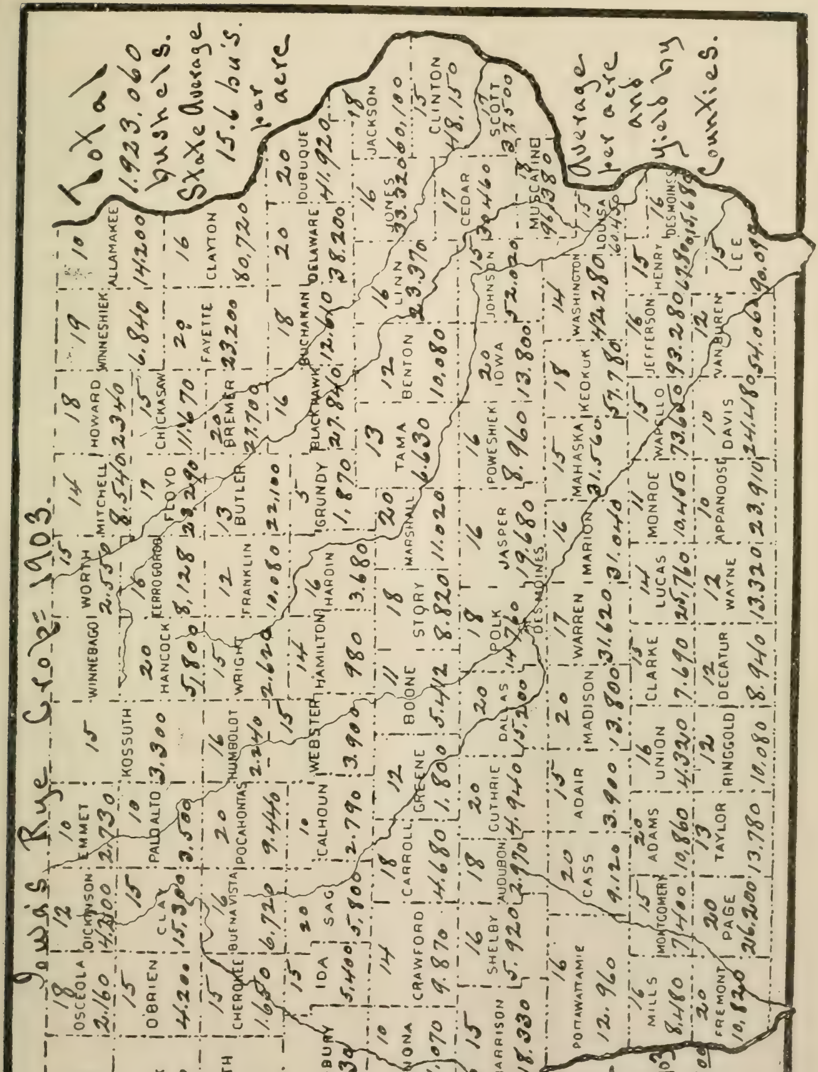
Average per acre. and Yield by Counties.

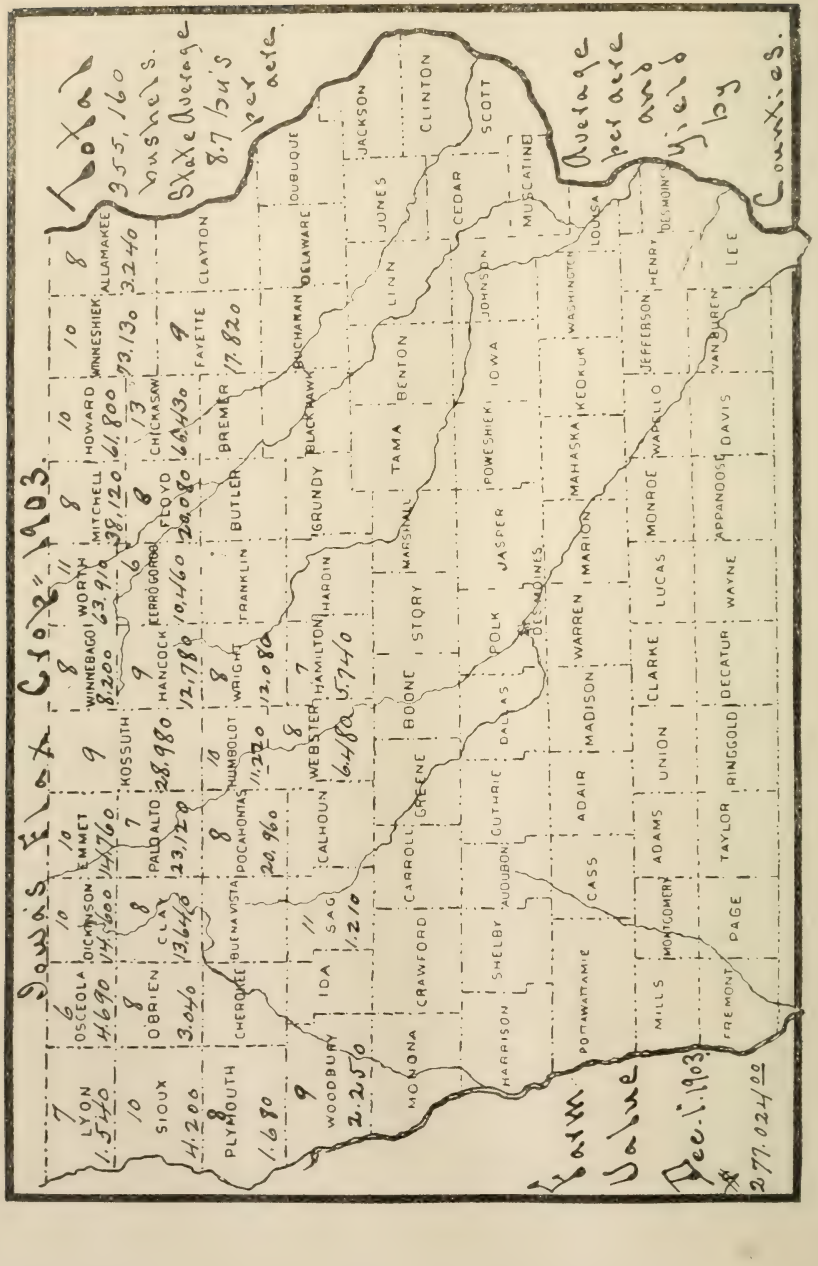
Farm Value Dec. 1." 1903 $6.162.877.00

11 LYON 397.390
8 OSCEOLA 97.680
10 DICKINSON 52,500
12 EMMET 31,680
13 KOSSUTH 197.380
12 WINNEBAGO 99.840
12 WORTH 48,120
10 MITCHELL 23,000
15 HOWARD 10,120
13 WINNESHIEK 92,560
12 ALLAMAKEE 38.320
12 SIOUX 756.720
15 OBRIEN 267,150
10 CLAY 62.300
11 PALO ALTO 30.470
13 HANCOCK 61.490
11 CERRO GORDO 10,560
12 FLOYD 5,240
15 CHICKASAW 15,150
12 FAYETTE 36.360
13 CLAYTON 75,730
12 PLYMOUTH 858,360
17 CHEROKEE 240.790
15 BUENA VISTA 54.660
12 POCAHONTAS 25,720
12 HUMBOLDT 53.460
15 WRIGHT 62,700
12 FRANKLIN 21,720
12 BUTLER 4,830
12 BREMER 5,040
12 WOODBURY 516,120
10 IDA 199,860
13 SAC 118.820
9 CALHOUN 40,410
15 WEBSTER 78,950
12 HAMILTON 37.080
11 HARDIN 49,610
12 GRUNDY 27,780
12 BLACK HAWK 5,760
15 BUCHANAN 7,680
16 DELAWARE 20,960
15 DUBUQUE 55,590
11 MONONA 646,200
10 CRAWFORD 424,270
12 CARROLL 198,600
12 GREENE 27.720
11 BOONE 34.310
14 STORY 21.940
15 MARSHALL 96.750
13 TAMA 93,860
15 BENTON 25,720
12 LINN 20,320
12 JONES 5,360
15 JACKSON 61.560
12 CLINTON 32,480
12 HARRISON 367.680
13 SHELBY 415,870
12 AUDUBON 23,032
13 GUTHRIE 122,330
14 DALLAS 53,760
15 POLK 61,650
DES MOINES
13 JASPER 99,600
13 POWESHIEK 34.190
19 IOWA 25,080
14 JOHNSON 17.220
16 CEDAR 21,120
16 SCOTT 115,440
15 MUSCATINE 23,100
12 POTTAWATTAMIE 469,320
14 CASS 269,080
12 ADAIR 118,200
12 MADISON 43.680
14 WARREN 3.240
12 MARION 44.120
12 MAHASKA 20,520
12 KEOKUK 9.840
14 WASHINGTON 4.480
13 LOUISA 910
10 MILLS 71.200
12 MONTGOMERY 128,510
11 ADAMS 35,320
12 UNION 1.320
CLARKE
LUCAS
12 MONROE 1,320
12 WAPELLO 2,160
12 JEFFERSON 840
12 HENRY 840
15 DES MOINES 7,200
11 FREMONT 22,770
13 PAGE 65,540
TAYLOR
10 RINGGOLD 130
DECATUR
WAYNE
APPANOOSE
DAVIS
VAN BUREN
LEE


Iowa's Oat Crop 1903.
Total
99.012.660
bushels.
State Average
25.9 bu's
per acre.
Average
per acre
and
yield by
Counties.
Farm
Value
Dec. 1st 1903
$
29.703.798
27 LYON 1.295.190
20 OSCEOLA 692,600
22 DICKINSON 58[illegible],680
33 EMMET 1.740.800
25 KOSSUTH 785,500
22 WINNEBAGO 882,420
31 WORTH 990.140
23 MITCHELL 1.399320
30 HOWARD 1.694.400
25 WINNESHIEK 1.756300
30 ALLAMAKEE 1.388300
28 SIOUX 1.422.680
30 O'BRIEN 1.672,200
25 CLAY 1.290.250
26 PALO ALTO 1.187.680
25 HANCOCK 1.837.000
28 CERRO GORDO 1.836.520
26 FLOYD 1.636.700
26 CHICKASAW 1.780640
25 FAYETTE 1.660.250
28 CLAYTON 1.831.760
25 PLYMOUTH 1.028.000
31 CHEROKEE 1.494.510
24 BUENA VISTA 1.255,680
25 POCAHONTAS 1.053,000
32 HUMBOLDT 1.200.640
24 WRIGHT 1.388.640
29 FRANKLIN 1.998.390
25 BUTLER 1.819.000
24 BREMER 1.229.520
30 WOODBURY 914,220
23 IDA 992350
31 SAC 1.617.580
23 CALHOUN 1.391.310
30 WEBSTER 1.986.930
22 HAMILTON 1.047.420
27 HARDIN 1.402.110
25 GRUNDY 1.565,920
28 BLACK HAWK 1.502,480
25 BUCHANAN 1.326.870
28 DELAWARE 1.352,540
24 DUBUQUE 1.256.400
30 MONONA 541.920
25 CRAWFORD 952.750
25 CARROLL 1.363.620
22 GREENE 976,240
24 BOONE 1.100.640
26 STORY 1.363.180
24 MARSHALL 1.294080
26 TAMA 1.252.160
30 BENTON 1.939.360
30 LINN 1.412.900
26 JONES 901.300
22 JACKSON 787.380
24 CLINTON 817.040
25 HARRISON 383.750
22 SHELBY 591.145
22 AUDUBON 703.340
26 GUTHRIE 900,920
30 DALLAS 1.094,280
31 POLK 1.007.940
DES MOINES
27 JASPER 1.168.130
26 POWESHIEK 1.003.860
30 IOWA 1.029.600
27 JOHNSON 1.081.620
32 CEDAR 1.095.680
23 SCOTT 559.970
28 MUSCATINE 602,560
23 POTTAWATTAMIE 690,230
25 CASS 755,250
25 ADAIR 741.250
27 MADISON 510.030
27 WARREN 618.560
20 MARION 569.600
30 MAHASKA 952,500
26 KEOKUK 901.300
23 WASHINGTON 749.910
28 LOUISA 617.080
23 MILLS 264.100
25 MONTGOMERY 348.000
21 ADAMS 268,170
22 UNION 409.700
21 CLARKE 332.910
30 LUCAS 412.800
28 MONROE 284.640
25 WAPELLO 366.000
27 JEFFERSON 1.168.803
25 HENRY 563,000
26 DES MOINES 653,120
25 FREMONT 222,550
22 PAGE 269.940
22 TAYLOR 355.740
23 RINGGOLD 490,360
25 DECATUR 398.500
30 WAYNE 447.120
27 APPANOOSE 263.950
23 DAVIS 350,060
22 VAN BUREN 260,260
21 LEE 439,340


Iowa's Barley Crop 1903
Total 12.179.790 bushels. State Average 24.7 bu's per acre
Average per acre and yield by Counties.
Farm Value Dec. 1. 1903 $4.561.522.00
25 LYON 1.063.000
17 OSCEOLA 494.870
20 DICKINSON 362.600
30 EMMET 246.300
25 KOSSUTH 173.740
23 WINNEBAGO 21,760
30 WORTH 54.490
25 MITCHELL 324.000
28 HOWARD 161.640
26 WINNESHIEK 268,060
30 ALLAMAKEE 209.760
26 SIOUX 876,660
20 O'BRIEN 522,600
22 CLAY 391.730
28 PALO ALTO 173,740
24 HANCOCK 62.640
25 CERRO GORDO 52.250
31 FLOYD 119,040
24 CHICKASAW 63,120
30 FAYETTE 152.700
30 CLAYTON 186.600
22 PLYMOUTH 225,060
26 CHEROKEE 135.460
22 BUENA VISTA 68.640
22 POCAHONTAS 68.420
30 HUMBOLDT 60.900
24 WRIGHT 39.120
25 FRANKLIN 25.550
20 BUTLER 16.400
24 BREMER 36.680
30 WOODBURY 222.360
22 IDA 97.460
28 SAC 145,890
21 CALHOUN 80,010
26 WEBSTER 30,160
20 HAMILTON 15.600
21 HARDIN 15,330
22 GRUNDY 233,080
24 BLACKHAWK 107.010
25 BUCHANAN 38,000
33 DELAWARE 168,960
33 DUBUQUE 83,820
25 MONONA 132,250
20 CRAWFORD 56.360
20 CARROLL 65,420
24 GREENE 53.040
20 BOONE 5.400
23 STORY 11,730
25 MARSHALL 64,350
22 TAMA 398,640
25 BENTON 339.600
25 LINN 23.570
30 JONES 186.600
30 JACKSON 104.200
22 CLINTON 113,410
30 HARRISON 31.830
21 SHELBY 133.770
25 AUDUBON 56.100
30 GUTHRIE 31.200
30 DALLAS 25.200
20 POLK 2.620
30 JASPER
30 POWESHIEK 130,260
28 IOWA 122,920
28 JOHNSON 176,120
30 CEDAR 265,300
21 SCOTT 214.600
23 MUSCATINE 149.730
DES MOINES
22 POTTAWATTAMIE 221.010
22 CASS 23.760
24 ADAIR 14,210
30 MADISON 51.600
24 WARREN 48,720
22 MARION 20,240
25 MAHASKA 70,250
24 KEOKUK 79.440
30 WASHINGTON 115.200
20 LOUISA 18.800
20 MILLS 8.400
20 MONTGOMERY 6.600
20 ADAMS 20.400
21 UNION 8,610
CLARKE
LUCAS
20 MONROE 6.400
23 WAPELLO 24.960
20 JEFFERSON 46.120
22 HENRY 46.370
DES MOINES
FREMONT
25 PAGE 28.000
19 TAYLOR 20,330
25 RINGGOLD 4.520
DECATUR
WAYNE
APPANOOSE
DAVIS
VAN BUREN
20 LEE 2,420


Iowa's Rye Crop 1903.
Total 1.923.060 bushels.
State Average 15.6 bu's. per acre
Average per acre and yield by Counties.
Farm Value Dec-1, 1903 $846,146.00
LYON 15 2.550
OSCEOLA 18 2.160
DICKINSON 12 4.200
EMMET 10 2.730
KOSSUTH 15 3.300
WINNEBAGO
WORTH 15 2.550
MITCHELL 14 8.540
HOWARD 18 2.340
WINNESHIEK 19 6.840
ALLAMAKEE 10 14.200
SIOUX 15 1.620
O'BRIEN 15 4.200
CLAY 15 15.300
PALO ALTO 10 3.500
HANCOCK 20 5.800
CERRO GORDO 16 8.128
FLOYD 17 23.290
CHICKASAW 15 11.670
FAYETTE 20 23.200
CLAYTON 16 80.720
PLYMOUTH 15 7.350
CHEROKEE 15 1.680
BUENA VISTA 16 6.720
POCAHONTAS 20 9.440
HUMBOLDT 16 2.240
WRIGHT 15 2.620
FRANKLIN 12 10.080
BUTLER 13 22.100
BREMER 20 27.700
BUCHANAN 18 12.610
DELAWARE 20 38.200
DUBUQUE 20 41.920
WOODBURY 13 10.530
IDA 15 5.400
SAC 20 5.800
CALHOUN 10 2.790
WEBSTER 15 3.900
HAMILTON 14 980
HARDIN 16 3.680
GRUNDY 5 1.870
BLACK HAWK 16 27.840
JACKSON 18 60,100
JONES 16 33.320
CLINTON 15 48,150
SCOTT 17 37500
MONONA 10 11.070
CRAWFORD 14 9.870
CARROLL 18 4.680
GREENE 12 1.800
BOONE 11 5.412
STORY 18 8.820
MARSHALL 20 11.020
TAMA 13 6.630
BENTON 12 10.080
LINN 16 23.370
CEDAR 17 30.460
MUSCATINE 13 96.380
HARRISON 15 18.330
SHELBY 16 5.920
AUDUBON 18 2.970
GUTHRIE 20 4.940
DALLAS 20 15.200
POLK 18 14.760
DES MOINES
JASPER 16 19.680
POWESHIEK 16 8.960
IOWA 20 13.800
JOHNSON 15 52.020
POTTAWATTAMIE 16 12.960
CASS 20 9.120
ADAIR 15 3.900
MADISON 20 13.800
WARREN 17 31.620
MARION 16 31.040
MAHASKA 15 31.560
KEOKUK 18 57.780
WASHINGTON 14 42.280
LOUISA 15 60.450
MILLS 16 8.480
MONTGOMERY 15 7.400
ADAMS 20 10.860
UNION 16 4.320
CLARKE 15 7.690
LUCAS 14 25.760
MONROE 11 10.450
WAPELLO 15 73.600
JEFFERSON 16 93.280
HENRY 15 67.800
DES MOINES 16 15.680
FREMONT 20 10.820
PAGE 20 26.200
TAYLOR 13 13.780
RINGGOLD 12 10.080
DECATUR 12 8.940
WAYNE 12 13.320
APPANOOSE 10 23.910
DAVIS 10 24.180
VAN BUREN 12 54.060
LEE 15 90.090



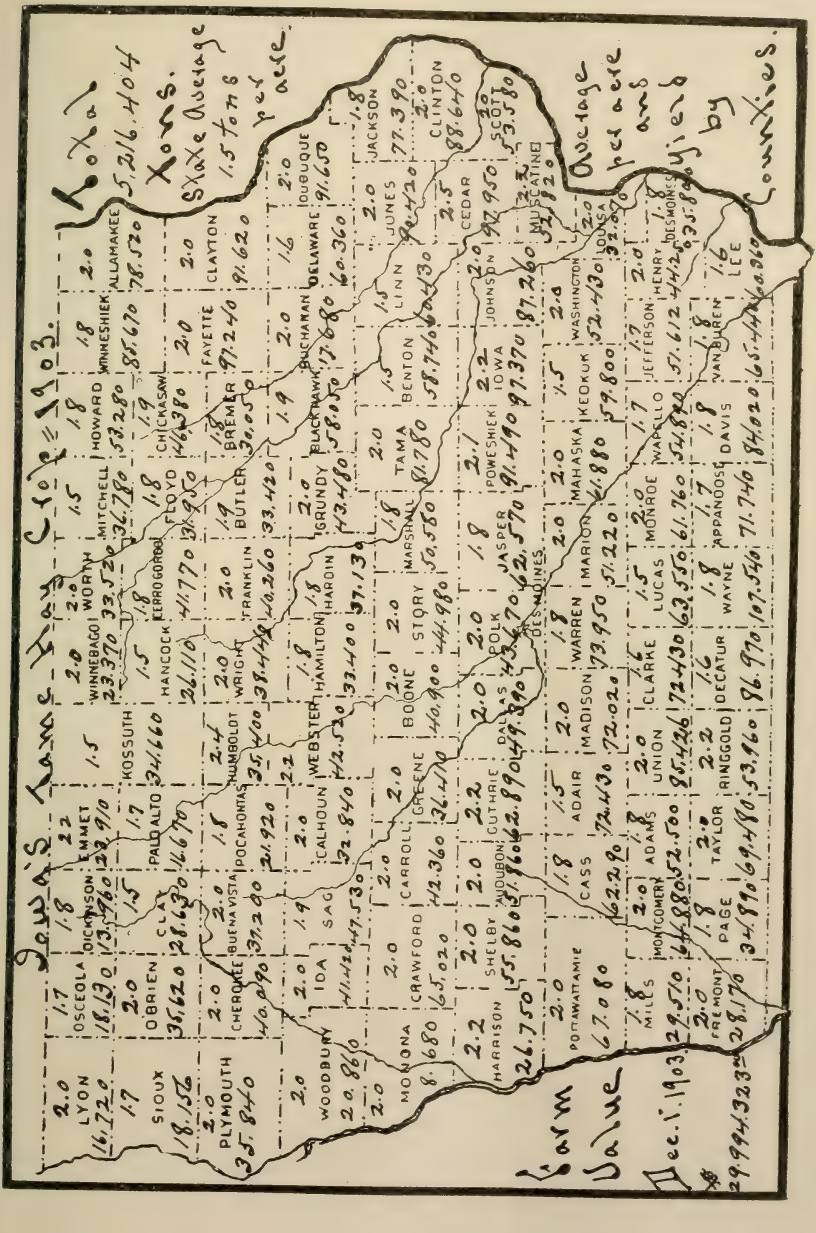
Iowa's Flax Crop 1903.

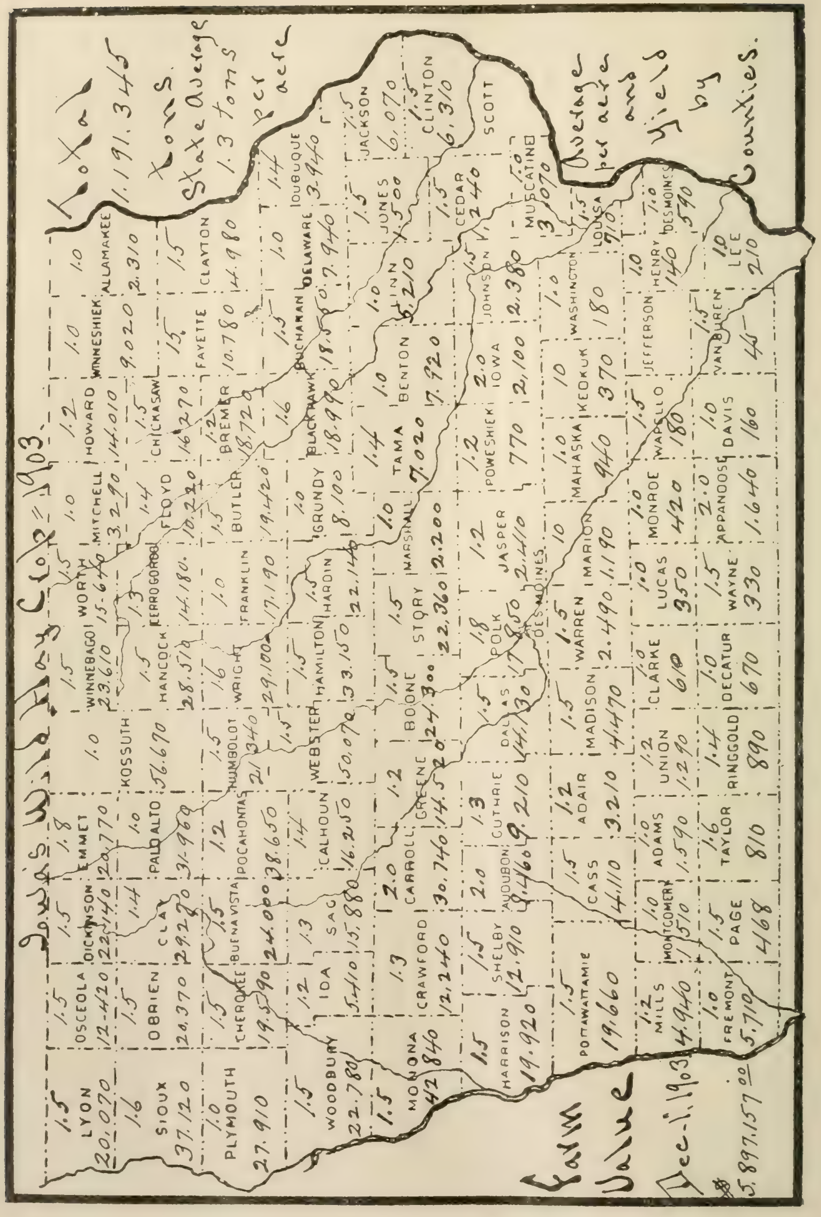
Total 355,160 bushels. State Average 8.7 bu's per acre

Average per acre and yields by Counties.

Farm Value Dec. 1. 1903. $277.024.00

LYON 7 1,540
OSCEOLA 6 4,690
DICKINSON 10 14,600
EMMET 10 14,760
KOSSUTH 9 28,980
WINNEBAGO 8 8,200
WORTH 11 63,910
MITCHELL 8 38,120
HOWARD 10 61,800
WINNESHIEK 10 93,130
ALLAMAKEE 8 3,240
SIOUX 10 4,200
O'BRIEN 8 3,040
CLAY 8 13,640
PALO ALTO 7 23,120
HANCOCK 9 12,780
CERRO GORDO 6 10,460
FLOYD 8 20,080
CHICKASAW 13 66,430
FAYETTE 9 17,820
CLAYTON
PLYMOUTH 8 1,680
CHEROKEE
BUENA VISTA
POCAHONTAS 8 20,960
HUMBOLDT 10 11,220
WRIGHT 8 12,080
FRANKLIN
BUTLER
BREMER
BUCHANAN
DELAWARE
DUBUQUE
WOODBURY 9 2,250
IDA
SAC 11 1,210
CALHOUN
WEBSTER 8 6,480
HAMILTON 7 5,740
HARDIN
GRUNDY
BLACK HAWK
JONES
JACKSON
CLINTON
MONONA
CRAWFORD
CARROLL
GREENE
BOONE
STORY
MARSHALL
TAMA
BENTON
LINN
CEDAR
SCOTT
HARRISON
SHELBY
AUDUBON
GUTHRIE
DALLAS
POLK
DES MOINES
JASPER
POWESHIEK
IOWA
JOHNSON
MUSCATINE
POTTAWATTAMIE
CASS
ADAIR
MADISON
WARREN
MARION
MAHASKA
KEOKUK
WASHINGTON
LOUISA
MILLS
MONTGOMERY
ADAMS
UNION
CLARKE
LUCAS
MONROE
WAPELLO
JEFFERSON
HENRY
DES MOINES
FREMONT
PAGE
TAYLOR
RINGGOLD
DECATUR
WAYNE
APPANOOSE
DAVIS
VAN BUREN
LEE


Iowa's Tame Hay Crop 1903.
Total 5,216,404 tons. State Average 1.5 tons per acre.
Average per acre and yields by counties.
Farm Value Dec. 1. 1903. $29,994,323
LYON 2.0 16,720
OSCEOLA 1.7 18,130
DICKINSON 1.8 13,760
EMMET 2.2 22,910
KOSSUTH 1.5 34,660
WINNEBAGO 2.0 23,370
WORTH 2.0 33,520
MITCHELL 1.5 36,780
HOWARD 1.8 53,280
WINNESHIEK 1.8 85,670
ALLAMAKEE 2.0 78,520
SIOUX 1.7 18,150
O'BRIEN 2.0 35,620
CLAY 1.5 28,630
PALO ALTO 1.7 16,670
HANCOCK 1.5 26,110
CERRO GORDO 1.8 41,770
FLOYD 1.8 39,950
CHICKASAW 1.9 46,380
FAYETTE 2.0 97,240
CLAYTON 2.0 91,620
PLYMOUTH 2.0 35,840
CHEROKEE 2.0 40,290
BUENA VISTA 2.0 37,200
POCAHONTAS 1.8 21,920
HUMBOLDT 2.4 35,400
WRIGHT 2.0 38,440
FRANKLIN 2.0 40,260
BUTLER 1.9 33,420
BREMER 1.8 30,050
BLACK HAWK 1.9 58,050
BUCHANAN 2.0 17,680
DELAWARE 1.6 60,360
DUBUQUE 2.0 91,650
WOODBURY 2.0 20,860
IDA 2.0 41,420
SAC 1.9 47,530
CALHOUN 2.0 32,840
WEBSTER 2.1 42,520
HAMILTON 1.8 33,400
HARDIN 1.8 37,130
GRUNDY 2.0 43,480
TAMA 2.0 81,780
BENTON 1.5 58,740
LINN 1.5 60,430
JONES 2.0 90,420
JACKSON 1.8 77,390
CLINTON 2.0 88,640
MONONA 2.0 8,680
CRAWFORD 2.0 65,020
CARROLL 2.0 42,360
GREENE 2.0 36,410
BOONE 2.0 40,900
STORY 2.0 44,980
MARSHALL 1.8 50,580
CEDAR 2.5 97,950
SCOTT 2.0 53,580
HARRISON 2.2 26,750
SHELBY 2.0 55,860
AUDUBON 2.0 51,860
GUTHRIE 2.2 62,890
DALLAS 2.0 49,390
POLK 2.0 43,470
DES MOINES
JASPER 1.8 62,570
POWESHIEK 2.1 91,490
IOWA 2.2 97,370
JOHNSON 2.0 87,260
MUSCATINE 2.2 52,820
POTTAWATTAMIE 2.0 67,080
CASS 1.8 62,290
ADAIR 1.5 72,430
MADISON 2.0 72,020
WARREN 1.8 73,950
MARION 2.0 51,220
MAHASKA 2.0 61,880
KEOKUK 1.5 59,800
WASHINGTON 2.0 52,430
LOUISA 2.0 32,070
MILLS 1.8 29,510
MONTGOMERY 2.0 64,880
ADAMS 1.8 52,500
UNION 2.0 85,426
CLARKE 1.6 72,430
LUCAS 1.5 63,550
MONROE 2.0 61,760
WAPELLO 1.7 54,820
JEFFERSON 1.7 51,612
HENRY 2.0 44,250
DES MOINES 1.8 35,800
FREMONT 2.0 28,170
PAGE 1.8 34,890
TAYLOR 2.0 69,480
RINGGOLD 2.2 53,960
DECATUR 1.6 86,970
WAYNE 1.8 107,540
APPANOOSE 1.7 71,740
DAVIS 1.8 84,020
VAN BUREN 1.8 65,440
LEE 1.6 60,960



Iowa's Wild Hay Crop 1903.

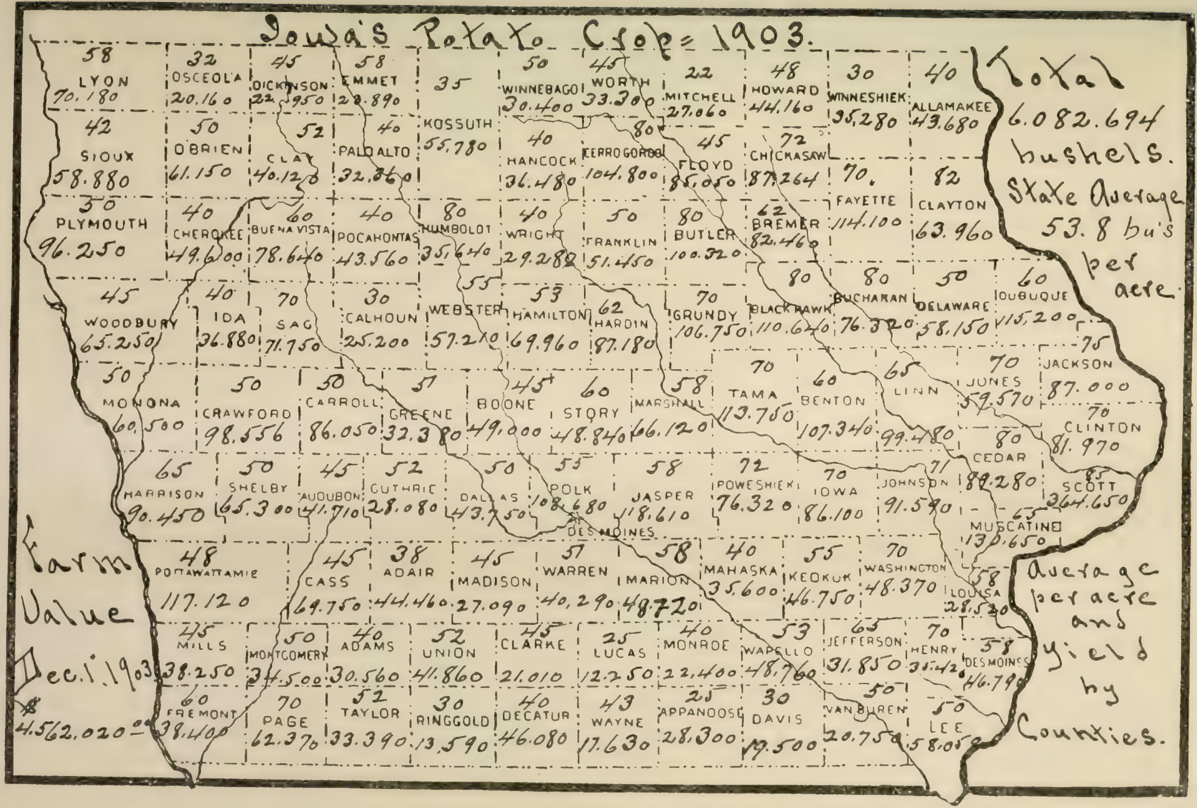
Total 1.191.345 tons.

State Average 1.3 tons per acre

Average per acre and yields by Counties.

Farm Value Dec. 1, 1903 $5.897.157.00

1.5 LYON 20.070
1.5 OSCEOLA 12.420
1.5 DICKINSON 22.140
1.8 EMMET 20.770
1.0 KOSSUTH 56.690
1.5 WINNEBAGO 23.610
1.5 WORTH 15.640
1.0 MITCHELL 3.290
1.2 HOWARD 14.010
1.0 WINNESHIEK 9.020
1.0 ALLAMAKEE 2.310
1.6 SIOUX 37.120
1.5 OBRIEN 20.370
1.4 CLAY 29.220
1.0 PALO ALTO 31.960
1.5 HANCOCK 28.570
1.3 CERRO GORDO 14.180
1.4 FLOYD 10.220
1.5 CHICKASAW 16.270
1.5 FAYETTE 10.780
1.5 CLAYTON 14.980
1.0 PLYMOUTH 27.910
1.5 CHEROKEE 19.590
1.5 BUENA VISTA 24.000
1.2 POCAHONTAS 38.650
1.5 HUMBOLDT 21.340
1.6 WRIGHT 29.100
1.0 FRANKLIN 17.190
1.5 BUTLER 19.420
1.2 BREMER 18.720
1.5 BUCHANAN 18.550
1.0 DELAWARE 17.940
1.4 DUBUQUE 3.940
1.5 WOODBURY 22.780
1.2 IDA 5.410
1.3 SAC 15.880
1.4 CALHOUN 16.250
1.5 WEBSTER 50.070
1.5 HAMILTON 33.150
1.5 HARDIN 22.140
1.0 GRUNDY 8.100
1.6 BLACK HAWK 18.990
1.5 JONES 5.500
1.5 JACKSON 6.070
1.5 CLINTON 6.310
1.5 MONONA 42.840
1.3 CRAWFORD 12.240
2.0 CARROLL 30.740
1.2 GREENE 14.520
1.5 BOONE 24.300
1.5 STORY 22.360
1.0 MARSHALL 2.200
1.4 TAMA 7.020
1.0 BENTON 7.920
1.0 LINN 5.210
1.5 CEDAR 240
SCOTT
1.5 HARRISON 19.920
1.5 SHELBY 12.910
2.0 AUDUBON 9.460
1.3 GUTHRIE 9.210
1.5 DALLAS 14.130
1.8 POLK 17.850
DES MOINES
1.2 JASPER 2.410
1.2 POWESHIEK 770
2.0 IOWA 2.100
1.5 JOHNSON 2.380
1.0 MUSCATINE 3.070
1.5 POTTAWATTAMIE 19.660
1.5 CASS 4.110
1.2 ADAIR 3.210
1.5 MADISON 4.470
1.5 WARREN 2.490
10 MARION 1.190
1.0 MAHASKA 940
10 KEOKUK 370
1.0 WASHINGTON 180
1.5 LOUISA 910
1.2 MILLS 4.940
1.0 MONTGOMERY 1.510
1.0 ADAMS 1.590
1.2 UNION 1.290
1.0 CLARKE 610
1.0 LUCAS 350
1.0 MONROE 420
1.5 WAPELLO 180
JEFFERSON
1.0 HENRY 140
1.0 DES MOINES 590
1.0 FREMONT 5.710
1.5 PAGE 468
1.6 TAYLOR 810
1.4 RINGGOLD 890
1.0 DECATUR 670
1.5 WAYNE 330
2.0 APPANOOSE 1.640
1.0 DAVIS 160
1.5 VAN BUREN 45
1.0 LEE 210


Iowa's Potato Crop 1903.
Total 6.082.694 bushels.
State Average 53.8 bu's per acre.
Average per acre and yield by Counties.
Farm Value Dec. 1, 1903 $4.562.020.00
58 LYON 70.180
32 OSCEOLA 20.160
45 DICKINSON 22.950
58 EMMET 23.890
35 KOSSUTH 55.780
50 WINNEBAGO 30.400
45 WORTH 33.300
22 MITCHELL 27.060
48 HOWARD 44.160
30 WINNESHIEK 35.280
40 ALLAMAKEE 43.680
42 SIOUX 58.880
50 O'BRIEN 61.150
52 CLAY 40.120
40 PALO ALTO 32.360
40 HANCOCK 36.480
80 CERRO GORDO 104.800
45 FLOYD 85.050
72 CHICKASAW 87.264
70. FAYETTE 114.100
82 CLAYTON 63.960
50 PLYMOUTH 96.250
40 CHEROKEE 49.600
60 BUENA VISTA 78.640
40 POCAHONTAS 43.560
80 HUMBOLDT 35.640
40 WRIGHT 29.282
50 FRANKLIN 51.450
80 BUTLER 100.320
62 BREMER 82.460
80 BLACK HAWK 110.640
80 BUCHANAN 76.320
50 DELAWARE 58.150
60 DUBUQUE 115.200
45 WOODBURY 65.250
40 IDA 36.880
70 SAC 71.750
30 CALHOUN 25.200
55 WEBSTER 57.210
53 HAMILTON 69.960
62 HARDIN 87.180
70 GRUNDY 106.750
70 TAMA 113.750
60 BENTON 107.340
65 LINN 99.480
70 JONES 59.570
75 JACKSON 87.000
50 MONONA 60.500
50 CRAWFORD 98.556
50 CARROLL 86.050
51 GREENE 32.380
45 BOONE 49.000
60 STORY 48.840
58 MARSHALL 66.120
80 CEDAR 89.280
70 CLINTON 81.970
65 HARRISON 90.450
50 SHELBY 65.300
45 AUDUBON 41.710
52 GUTHRIE 28.080
50 DALLAS 43.750
55 POLK 108.680
58 JASPER 118.610
72 POWESHIEK 76.320
70 IOWA 86.100
71 JOHNSON 91.590
65 MUSCATINE 130.650
85 SCOTT 364.650
DES MOINES
48 POTTAWATTAMIE 117.120
45 CASS 69.750
38 ADAIR 44.460
45 MADISON 27.090
51 WARREN 40,290
58 MARION 48.720
40 MAHASKA 35.600
55 KEOKUK 46.750
70 WASHINGTON 48.370
58 LOUISA 28.520
45 MILLS 38.250
50 MONTGOMERY 34.500
40 ADAMS 30.560
52 UNION 41.860
45 CLARKE 21.010
25 LUCAS 12.250
40 MONROE 22.400
53 WAPELLO 48.760
65 JEFFERSON 31.850
70 HENRY 35.420
58 DES MOINES 46.790
60 FREMONT 38.400
70 PAGE 62.370
52 TAYLOR 33.390
30 RINGGOLD 13.590
40 DECATUR 46.080
43 WAYNE 17.630
25 APPANOOSE 28.300
30 DAVIS 19.500
50 VAN BUREN 20.750
50 LEE 58.050

PART III.

IOWA SWINE BREEDERS.

ANNUAL SESSION OF THE STATE ASSOCIATION
CONVENED AT DES MOINES, IOWA, JUNE
16, 1903.

By C. C. Carlin, Special Representative of the Twentieth Century Farmer.

OFFICERS OF ASSOCIATION.

HARVEY JOHNSON, President,	Logan.
B. R. VALE, Vice President,	Bonaparte.
J. A. MUNSON, Vice President,	Maxwell.
GEORGE S. PRINE, Secretary and Treasurer,	Oskaloosa.

EXECUTIVE COMMITTEE.

W. Z. SWALLOW, W. D. MCTAVISH, I. C. REESE.

IMPORTANT POINTS DISCUSSED.

The obligations of swine breeders and the moral aspect of their business methods were discussed. Boom prices and "trade" sales were deprecated as harmful to breeder and farmer alike. Swine breeding and corn growing were shown to be interdependent industries, each successful only through the progress of the other. The place occupied by corn in the feeding list of the breeder is entirely different from that of the feeder. Views of the practical experimenter and those of the scientific man. What is being done by the scientific experimenter toward producing a variety of corn that shall be a balanced ration in itself, and how the practical man on the farm is making use of those crops that balance each other. Clover, rape and alfalfa and their value to the pork producer. Some facts gained by experience and more opinions gathered from observation. The unity of interest existing between the breeder of hogs to be used for breeding purposes and he who breeds for pork only. There is a growing recognition of the necessity of using mature breeding stock in so far as it is possible. An expression is made in favor of changing classes at shows so that the difference in ages in a class would not be so great.

The annual meeting of the Iowa Swine Breeders' Association took place at Des Moines, Tuesday, June 16th. There has not within the past decade been a meeting at which the attendance was reduced to so small a number. There was a failure of perhaps one half of the program as had been arranged. Notwithstanding these discouragements, however, a most interesting session followed, and there have been few former meetings at which so much really practical information has been brought up in the after discussions. The injection of the corn idea was well received, and the entire evening session was devoted to that subject alone.

President Harvey Johnson of Logan, Iowa, and Secretary George S. Prine of Oskaloosa, Iowa, were both present and President Johnson opened the meeting by saying:

Another year has passed and we have assembled in our annual meeting. As we glance back over the year we feel within us that sense of gratefulness that should have a place in every man's life. Grateful that our lives have been spared and that so few of our fellow breeders have fallen by the wayside; grateful for health and strength; grateful for peace and continued prosperity; and grateful that we are citizens of the best State in the best nation on earth; two facts that are now established beyond the point of controversy.

To us the past year has been one of reasonable prosperity and the indications are that the present conditions will prevail during the coming year, and I am glad to see it, for I believe that all worthy persons and worthy enterprises are entitled to success. It is gratifying to us to note the growth and development of the live stock industry of our country, and especially that part of it with which we are identified. The breeding and packing of pork has within the last generation come to be a marvel and its figures, both in point of number and in value, are almost beyond comprehension.

It is the leading industry of our State today and were it to suddenly stop there is no other branch of industry that would not feel the effects of it. We as swine breeders are engaged in producing the foundation material for this great industry, and upon us to certain extent depends its success. Knowing this, it is certainly expected of us that we will use all wisdom and good judgment in doing our part; that we will use all available knowledge and that we will avoid doing anything that will bring reproach upon it or injure it in any way.

While there are many points relative to our business that might be touched upon, there is just one in particular that I want to call your attention to, for it is certainly working an injury to the business and more especially should be brought to the attention of the younger breeders—the older breeders understand it and can not be misled by it. I refer in particular to the series of boom sales, with all their various attachments and fictitious prices, that are now being engaged in by some of the younger breeders of some of our neighboring states. To the young enthusiastic breeder the report of these sales comes as a wonder and he looks forward to the time when he, too, can make such reports, but to the old breeder who reads between the lines it comes with a feeling of disgust and indignation to think that these men engaged in breeding a noble animal like the hog will stoop to such deception in the endeavors to draw trade.

This is not business and is not right, and the men who engage in it are not permanent fixtures in the business and we as breeders can not too strongly condemn this, for it casts a shadow upon our occupation and is an injury to the business. While the accusation may seem severe, I have only to say that the case warrants it, and while we say this we do not say one word against the straightforward, honest sale, either public or private, no difference by whom it is held or what the average is, but our condemnation is solely upon the boomer, the man who mixes deceit with his business, who must have a larger average to report even if he has to promise an equal amount of bids at all the sales for the next six months, or have every member of his own family become bidders in order to accomplish it. Let us hope that the day is not far distant when these bubbles will burst and out of the wreckage will come at least the warning to others that that way was not only dangerous, but very unprofitable.

I am indeed glad that the breeders in our State have not engaged in this, but as far as we are able to learn they have been examples to others in this, as well as in careful and conservative methods, and I hope it may continue so.

I hope we may all strive to set up a high standard in all departments of our work, so that our State may be as worthy in this as in other lines.

D. L. Howard of Jefferson, Iowa, followed with a talk on Iowa Swine and Corn Association.

I was greatly interested in the address of our president and his account of the relation of the State to the people of the State, and I thought as we have gathered here from year to year, and many have gathered in other places in the interest of the swine industry, that these meetings have been the most potent of anything in the development of the swine. Not a great while ago I ran across a little publication entitled The Pig. It was printed in 1870. I have read it partly through and as I have read of the development of the hog from 1830 to 1870 I am astonished at the progress that has been made. When I think of the progress made in the breeding of hogs in the last twenty years, with everything that we have had to aid us, I am not surprised that we have the animal as he is today. At the time this article was printed they knew nothing of the pure Berkshire hog. Here I am speaking of the raising of hogs where they laid the foundation of the great breed, but I read about the ancestors of these hogs, and I thought when I was reading it how much value it would be to us. It gave the origin of the Berkshires as being of comparatively recent date and much interesting information on the means by which the present high state of perfection had been attained.

I also, a few days ago, took a clipping from a daily paper, entitled "Facts of Value About Iowa." From it I learn that Iowa has almost thirty-six million acres of land; that 86½ per cent of that is under cultivation in one way or another in raising fruits and crops. I learn also that we have two million two hundred and fifty thousand population and that we cast a vote for every three and one half of this population. I learn farther that we have ten million pigs in Iowa, which is, as I said, the greatest State in the greatest country on earth. At the same time Iowa has not all the hogs on the earth, but when ten million hogs are in the territory of thirty-six million acres, in a State with so many farms and 65 per cent of those farms managed by the owners, it will be seen that the wealth of the stock of the State of Iowa is almost fabulous. We have fourteen million horses, valued at $40.12 each, and sheep and cattle and poultry besides. Now, the development of the animal has kept pace with the development of men who raised the hogs or cattle or horses. We have gathered together from year to year and have set up an ideal of perfection, that ideal having for its object progress in the breeding of the animal that will increase prices and bring it to a higher standard. So I say that while the breeders fifty or sixty years ago were trying to improve the animals, the great progress they made is not at all wonderful. In the last twenty years the farmers of Iowa have been able to produce the hogs of the best class. I learn that Iowa raised about nine million eight hundred acres of corn, about one fourth of the total acreage of the State.

Last winter it was my pleasure to attend the short course at Ames. I had never had it so strongly before me until I went there and found this study of corn so improved. I learned that corn could have too deep a kernel to have good features; it could have too wide a kernel; that some kinds of corn had more protein in it than other kinds; that when you feed it to your horses or hogs it was more nearly a balanced ration; and, as Iowa is the center of the corn belt of the world, it is a feature important to every raiser of corn and to every man if he is interested in the material wealth of his State.

Now, I learn from some experiments in Illinois last year that by the careful selection of seed and sowing it and screening it they could produce from five to eight bushels more to the acre with the same kind of cultivation. Now, I have been very careful about selecting corn and thought I raised pretty fair corn, but I realize that I might improve a good deal more. Take nine million eight hundred thousand acres of corn and see what you can increase your crop by the proper selection of corn by one bushel to the acre. What does it mean? It would mean three hundred thousand dollars to the State of Iowa. If you increase it five bushels to the acre that would make one million five hundred thousand dollars. I say that hogs and corn are a vital part of the material wealth of Iowa, and it is, therefore, essential that we should study the best methods of increasing our returns from them. There are three sources of wealth in the world—the sea, the soil and the mine. We raise the corn from the soil and great wealth is brought from the sea and the mines. When an individual can, by improving the few acres of land that he may have, increase the value of his own pocketbook, he adds to the material wealth of the State and enables the farmers to increase their incomes also. It is certain that if his income becomes depreciated the income of other people becomes depreciated also. I say that it is right that everyone should be interested in this great subject of the development of corn.

In the discussion following this paper Mr. Prine said:

While we are all so interested in hogs we are certainly interested in what we feed them, and if we can learn more about corn we should do so. I would like to see these two associations blended. We need it and we can do it, and we can just as well do it now and in this meeting as any time. I would like to see the corn interest incorporated with this Iowa Swine Breeders' Association. It would be interesting and our working together would be to our advantage. So let us take up the work along this line and incorporate the corn association.

Mr. Lee said:

If there is any way possible by which I can in the fall get from my corn that which will keep me from having to buy shorts and bran I will be glad to find the way. I believe that it is a great opportunity indeed, and if there is any science in it I would like to get a little of it. I have tried to get good seed corn. A great seed corn was advertised and I sent for some and planted it. But I had some of my own that I had been saving for thirty years, and planted some of that. In the fall my own corn proved the better. The very fact of the difference between the hog of today and the hog when I was a boy reveals what can be done by culture, by study, by thought, and I see no reason why this new thought that has come to us of breeding the best corn, why great improvement can not be made. If there is any way that we can produce corn with more protein we should do it. I find that I can produce better hogs with corn than without it. The kind of hog you raise depends upon what you feed him and when and how.

"The Coming Hog," was the subject treated by W. D. McTavish of Coggon, Iowa:

The coming hog will, of course, be a product of the future, and as such will necessarily have to meet the requirements of the conditions as they will exist in the future. For any man to stand up here and undertake to tell this intelligent body of swine breeders just what they should produce for the future, or what would have to be produced to meet future demands, would, to say the least, carry with it no more weight than a personal opinion. and might be regarded as presumptuous.

It is, however, comparatively safe, in the light of the past, to expect that the hog of today will be improved in many ways. The partisan will say: "This does not apply to my favorite breed, for they do not need improvement—they are good enough." Let me tell you, Mr. Partisan, you are no real friend to your favorite breed if you do not recognize its weak points and strive to correct them, because if they are not rectified your breed can not be the "coming hog."

There will always be a difference of opinion among hog raisers regarding type, color and characteristics. Environment will establish and maintain these in spite of the tastes or efforts of the breeder. I do not mean to say that the breeder cannot change color or mold type by judicious breeding, but type can not be held against environment. For instance, how long would the lard hog continue to be a lard hog in Canada or Ireland, and how long would the bacon hog continue to be such when fed exclusively on Iowa corn. This question of environment enters so largely into the production of the coming hog that the conditions of the future must be known to foretell their product. With the extended use of woven wire fencing it is becoming more common for hogs to have free access to large pasture fields. As this becomes more and more general the hog will gain in vigor and constitution and will no doubt make a very fine quality of bacon when killed before he is too fat and just as good lard when fattened on corn. But with the quality of corn we have at our disposal in the corn belt the lard hog will no doubt always be with us.

The hog raising fraternity is composed of "many men of many minds," hence there will always be room for the different breeds to supply the ideals of the many minds regarding color and minor characteristics. But as the end of the coming hog is the same as that of his ancestor he must be, whatever his color, type or characteristics, the hog that will convert our grasses and corn into the greatest possible amount of desirable pork.

This paper excited a good deal of comment. Professor Olin asked what the breeders of hogs considered the most essential point at the present and what change in the feed must be made in order that we improve. To this Mr. McTavish replied:

It has always been my opinion that it was too much corn that kept from the hog that straightness and strength of bone and good muscle that is necessary to make a strong, healthy, vigorous animal.

On this point Mr. Prine added:

It occurs to me that we need something to balance up the corn. We have our pastures, but we need more of this and should raise a corn that is adapted to the growth of the pig.

Mr. Turner said:

I came here to find out, not only with regard to corn, but what else we should use and how to use the foods that we have on the farm to avoid buying feed. I want to hear the opinions and experiences of the breeders as to the feeding value of rye, oats and barley. We thought a hog would die fed on oats when I was a boy. We are right in the grain country and the hogs followg the cattle and we feed them corn. I would like to know how we can utilize the grains we use on the farm aside from the corn, to avoid buying these feeds. I would like to know and hear fro mthe breeders who have used these other feeds.

Dr. Hammer expressed some good ideas as follows.

In what is it that the most people fall down? It is up to you to meet the expectations of other men and improve the hog. It is a mistake to breed stock too young. You have to make the parent mature if the offspring is to be of any use. A brood sow must be three years old before you can see what there is in her. A man I know is using a sow now which did not show any development until she was three years old. If you breed a sow to a six-months-old male you will get three or four pigs. I would never use breeding sows until they are over a year old, at least, and then breed them right along and give them food that will produce fine stock and develop their bone. I have been interested in breeding hogs for a good many years. This is the corn belt, and we are in the center of it. There are other things as essential as corn, and if we can raise alfalfa in this country it might mix well with the corn. They say they are raising alfalfa on the hills in the West. If alfalfa will grow there it will surely grow here. I want this hog association to get some alfalfa seed and try it. It takes two or three years to get started and then you will have it right along. Just think of it and you will find that it is just as essential to have alfalfa to mix with your corn as anything else for a progress, for this association should bring in everything along this line. Breed from a matured animal, and when you get the pigs you have them large enough so that you can breed pigs that at six months old will weigh 250 pounds. You will interest men in that way.

As a continuation along this line Mr. Swallow said:

I listened to Mr. Hammer's talk and I think none of the men who heard it and who are interested in hogs can put too small a value on pasture for your hogs. We want corn, but we want pasture, too. The corn business will grow and build up just as our pig business has. There are just a few who can look into this and teach us all about it. Of course, there is the fault of keeping the hogs in too small lots and feeding them too much corn, and those who do so are not making good hogs. Put all these things together—plenty of pasture, room and corn and plenty of exercise, and your hogs will be good.

Mr. Munson, who advises against the free use of corn to breeding and growing stock, said:

While we are studying the corn it would be worth our while to prepare the seed bed better if we want to increase the bushels. If you have the right kind of a seed bed you can raise without a doubt, from three to five more bushels to the acre than if you have the same kind of seed in a seed bed badly prepared. I have found that, as a rule, I can not feed much corn to my hogs. I do not believe that corn is the feed for a breeding hog. During the winter I feed my hogs only about two ears of corn. When I put them in the fattening pen I feed them plenty of corn, but it will not pay for any breeder to feed his hogs too much corn. It produces fat—not bone. My brood sows get nothing but a very light slop and plenty of exercise. They have had good pasture and they are not worth giving corn if they will not be good on that.

This again brought Mr. Swallow to his feet with the remark:

You think it about the right thing to feed them plenty of corn while they are on the pasture? You have to give them some corn. I have always had to. Iowa corn is a pretty good article to have around.

To this Mr. Munson replied:

I do not want you to understand that I do not feed any corn at all. I feed 2 per cent corn and 2 per cent oats. Now I have seventy-five brood sows that are not getting any corn at all and they are not going to get any. I can raise pigs without corn. My pigs that are running on white clover are not getting corn, but good slop. Now, I have two sows; one lacks seven days of being a year old. They are not fat when they have their pigs and their pigs do not get fat when they are sucking them.

Mr. McTavish steered the discussion into a talk on alfalfa. He said:

It is just along this line that I would like to have shown what should be the balance for our corn. I believe we will all admit that the pasture is the thing to balance our corn. It is the thing to give health, vigor and strength to the animals. But some men will talk about a hog pasture and think a pasture of four or five acres sufficient for a large number of hogs. Some men have timothy pastures and think their hogs as good as the man's who has a good clover pasture. But we can have something better. We can have alfalfa. We can raise it in this country. Mine is doing fine so far, but, of course, it must come through the winter before I can tell what will become of it. If we can raise it we can give it to our hogs, and we know they need it. But you have to use brains in this hog business. You have to use it in order to have the best success, and it seems that, as Mr. Swallow has said, it would be well to put our hogs on a pasture that is suited to them, and then feed them all the corn they want. I have done so at home with good results and have my pigs coming along with wonderful good growth and I do not stint on corn, as long as they have plenty of clover and milk or anything that will balance it up. Study what to feed your hogs. Mix a good deal of brains, so to speak, in with the feed, and you will have success. If you do not you will run up against failure.

To this Mr. Johnson said:

There seems to be a great problem in pasture for hogs. I have white and red clover and alfalfa and that is what they need. What we want to do is to give our hogs pasture, not put too many together and not breed from too young stock. Do not use a sow until she is past a year of age. This is an interesting topic and we must think of it.

The program provided for a paper on the subject, "Precautions to the Breeder," but the gentleman to whom it was assigned failed to respond. Mr. Turner referred to it briefly, saying:

What is the meaning of this "precaution of the breeder," that is as regards business transactions? I think that we, as business men, should do a good, straightforward business. If a man buys an animal for breeding purposes I feel that he is entitled to something that will do him some good. If we sell a thoroughbred hog the buyer is entitled to a pedigree and not have to wait six or eight months for it. I feel that we, as a body, should take some action as regards this matter. I bought a thoroughbred sow some time ago. I have waited five months for the pedigree and am about to send the hog back and demand my money. The seller said she has never raised any pigs for him and she has not for me. I would like to know the idea of the association and how far it justifies it.

No new light was shed on this vexatious subject:

"Alfalfa and the Hog," was another subject proposed, but on which the paper failed to appear. Henry Wallace, however, expressed himself on the matter as follows:

I have lately been out in the alfalfa country and learned that they raise more hogs there than we do, and raise them on alfalfa. Five pounds of alfalfa chopped fine and one pound of corn a day will make them gain about six tenths of a pound a day. I spent about a week among the farmers, and what struck me was the fact that hogs grow on alfalfa into different kinds of hogs. That is, they are longer and more of the bacon type. Alfalfa puts more bone and muscle into them. The Nebraska Experiment Station takes pigs fed on corn and then alfalfa and breaks the bones and they find that the breaking strain of the bone of hogs fed on alfalfa is from four hundred and fifty to five hundred pounds and of the corn hogs three hundred and fifty pounds. We can grow alfalfa if we take the proper precaution. We can not cure it, but we can grow it enough for hog pasture, if we go about it in the right way. And I think we can do it with a good deal of success.

They do not like to keep more than six hogs together. If you put more than that together they will run it out with trampling. They make paths through it, and in that way they keep the alfalfa free, and do not interfere with making a crop of hay. I saw the railroad men and they said they could keep the alfalfa hogs separate from the corn hogs during the cholera times by disinfecting their cars and making separate chutes for them where they are loaded and unloaded, and allow nothing else to go through them except alfalfa hogs. Now, I am satisfied that there is a good deal in this. I want you to see that we can grow alfalfa Alfalfa should be cured when the bloom first begins to come out. If you wait you will find it very difficult to cure. Alfalfa is certainly a good hog feed in the winter. The gentlemen I visited feed five pounds of alfalfa to a pound of corn. and they find it profitable. They have kept books on it and I have no reason to doubt their word. To raise alfalfa you must prepare your seed bed in the best possible manner. The best way is to let it to someone to raise beets on for a year and then it is just ready for the alfalfa. In the fall take your land and get it into the best possible shape. Start weeds and then disc your land; and when the weeds start again disc it again. Sow your alfalfa about the first week in May or the last week in April on up to the first of June, and when it begins to put out blossosm cut it off and mow it again and again. You have to cut it off every time it begins to grow.

Another gentleman went on to say:

I have a friend who sowed three acres the last of April. It is about three to six inches high and in three or four weeks it will have to be cut off. He has been growing alfalfa for some time. He is a breeder of Aberdeen-Angus cattle and when the alfalfa gets up about so high he turns them on it and cuts it down. Then he lets it grow again and gets a second crop the same year. There is one thing of which Mr. Wallace spoke that is very important. That is, that it should not be pastured early in the fall and it should not be pastured the first year. If it is left to grow, probably one to four inches high, and the frost settles down on it, it will preserve it.

Mr. Munson asked:

You speak of cutting alfalfa fine to feed hogs. We are not fixed here to feed alfalfa. Is not clover prepared in the same way just as good?

To this Mr. Wallace replied:

I think if you will chop your clover fine and put corn with it, it will do just as well.

On the subject of feeding clover to hogs Mr. Munson said:

I read an article about feeding hogs clover. I did not believe it, so one morning I tried it. I had ten old sows. and when I put the clover out I did not see one of them. but before long they were every one there and ate it all.

Mr. Failor added a few words on the corn question:

I want to say a little along the line of hogs and corn. Hogs and corn go well together, but there are other things to be considered. What are we going to do with the land that we cannot raise corn on? We can not feed corn alone. It is not good for the hogs and our hogs are better off with a balance of wheat, barley or rye. Now, we have the hogs to feed and we need the wheat and barley and rye to balance the corn. What is the use to talk corn all the time when we need these other things to balance our farms and our feed? It is just as easy to raise them as a balanced ration as it is to undertake to raise the corn as a balanced ration. I have been raising hogs for a good many years, and I have learned by experience to use a good deal of something more than corn.

Mr. Munson followed by saying:

We have been talking corn and hogs and we want to talk sensibly. If we can raise an extra bushel of corn to the acre by better cultivation we might raise from five to twenty extra bushels by preparing our seed bed better, as has been suggested, and by better cultivation.

Dr. Hammer said:

When we think of going into the hog business I think we should follow Mr. Swallow. A little more milk and never so much that a little more would not be better. I found the Jersey has a great deal of cream. We concluded to try the Holstein. We found the Holstein milk breeds the very best stock. It produces bone and muscle, while the Jersey makes fat. My son and I got seven cows and sold cream enough to pay a man to work on the farm and fed the milk to the pigs. The sooner you can get the milk to the pigs and calves the more healthy it is for them. We take a heaping tablespoonful of oilmeal and stir it up and then pour in the milk and give it to the pigs. There is nothing like Holstein milk for pigs. Keep your lots sowed in rape for pasture. The first time I sowed it the neighbors all wondered at it. I sowed one and one half acres and when it was grown I turned half a dozen sows into it. At the end of six weeks I had sold thirty-six of thirty-eight head fed on it. And now I notice that the neighbors are sowing it, too. I used to buy oilmeal and shorts and bran, but now I am raising rape and oats and corn and I put my corn up and have green corn all the year around. I raise everything I feed to my cattle and hogs on the farm and I think we should do it. Use the rape and alfalfa and corn and raise everything on the farm that you feed your stock.

Mr. Munson came back to corn again and said:

It seems as though I stirred up a kind of hornets' nest when I said I did not feed corn. You misunderstood me. I do not believe in feeding corn to breeding stock, but if you have a pig that you are fattening feed him all the corn you can. But if you have nice breeding stock that you are trying to develop and grow, I say, feed him no corn.

Mr. Johnson gave alfalfa a little boost when he said:

Last spring we sowed a hillside that would grow very poor corn with alfalfa, and it is just wonderful to see it now. I can get about two tons to the acre, and a dealer paid me $9 an acre for the first crop and it certainly ought to get another crop just as good as that is this year. This shows what the poor soil will produce in alfalfa.

Mr. Wallace said:

Alfalfa is not a pasture except for hogs. It is simply a hog pasture, and cattle and sheep should be kept out. The college here is trying to get a carload of alfalfa and have offered $12 a load.

Mr. Turner brought up the question of State fair premiums:

There is a question that I thought might be of interest to the breeders, and that is with regard to having the State act with the association in the matter of premiums. Now, I believe that on hogs they have nothing except six months, six months and under one year and one year and under two, and it seems to me that it would be a good plan to get the association to change this so that the hog that is thirteen months will not have to compete with the hog that is twenty-three months, and give them a better chance. If this association would take some action to request this change it would please a good many.

Mr. Johnson said:

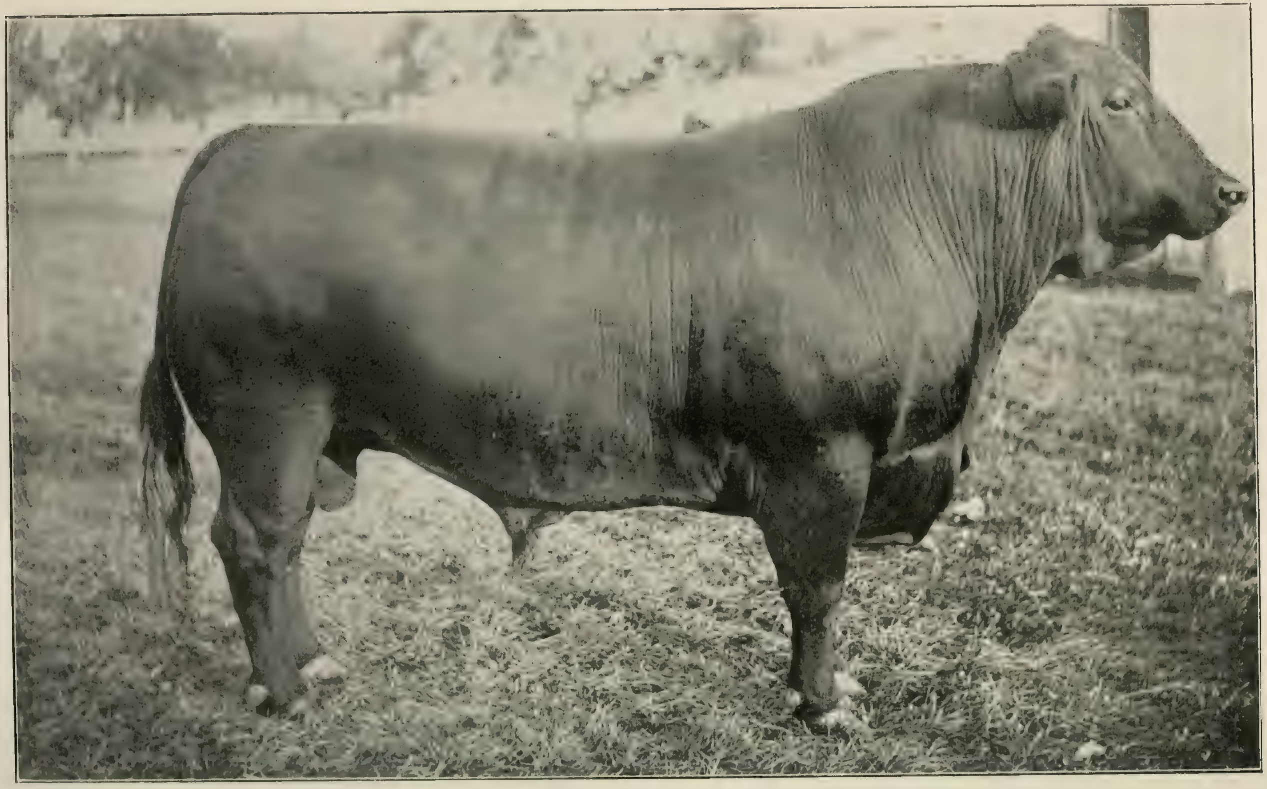
This matter has been acted and passed upon and it was promised the grand sweepstakes prize would be abolished and an extra class provided. The premium list has dropped the sweepstake prize, but failed to give the extra class.

The matter was referred to the committee on resolutions.

Hon. F. D. Coburn of the Louisiana Purchase Exposition had been placed on the program for a talk on the coming World's fair at St. Louis. Being unable to attend, he sent a paper, which was read.

The dates contemplated for the swine exhibits are from October 3 to October 15, 1904, but our preliminary schedule is of course subject to revision. The dates proposed for all live stock exhibits extend from August 22nd to November 5th. It is planned to have the cattle shows over by September 24th, thus giving ample time to get them out of the way before the swine people will want the room for their exhibits.

A feature being considered is the holding of public sales under the auspices of the different breeders' associations. This is already attracting the attention of breeders and the associations are



Champion Aberdeen-Angus bull, season of 1903. Owned by C. B. Gardner, Blandinsville, Ill.

already making applications for sale privileges, the American Berkshire Association being among the first. It is expected that a special building will offer facilities for these sales, so that they may be held independent of anything going on in the show ring, which will occupy an entirely separate building.

EVENING SESSION.

The entire evening session was devoted to talks on corn and corn culture. D. B. Nims of Emerson, Iowa, forwarded a paper, in which he said:

Since Iowa has shown that it takes no second place in the galaxy of states as a producer of cabinet officers, Spoor trophy winners and live stock breeders, why should it not lead the world in corn? There is no good reason why Iowa should not excel all other states in corn as well as in live stock. This will surely follow if the same principles of breeding and selection are used in the production of corn as are used in the production of live stock.

Corn is yearly becoming a more important crop, and every means should be used to increase the yield per acre and also to increase its feeding vaule. This should be done for the same reason that we seek to produce a bullock that will give the largest per cent of high-priced cuts. We should talk corn to our boys at home and talk corn to our neighbors, and we should study corn. We should also score corn, not in an indifferent way, but enthusiastically. The cattle breeder or the hog breeder who does not carefully study his animals will never become an expert breeder. Corn is susceptible to just as much improvement as live stock.

The swine breeders years ago formulated a score card for judging hogs. Iowa corn growers formulated the first score card for corn. They have changed that score card from time to time, much as the score card for hogs has been changed. Iowa corn breeders have produced some first-class varieties of corn that are especially adapted to Iowa conditions. We anticipate that the corn show at Ames, January 4th to 17th, will bring together the greatest exhibit of corn ever collected. We will find it profitable to give this subject more careful attention. We should not get into ruts and think we can't make any more improvement. We should adopt the "Iowa idea" as applied to corn raising as well as all other matters.

Prof. W. H. Olin, assistant in agronomy at the Experiment Station of the Iowa Agricultural College, gave an extended lecture on "Improving Corn to Meet Pig-Feeding Requirements." It was illustrated by the numerous enlarged photographs of varieties and forms of corn. His remarks were as follows:

One of the most unique cartoons that I ever saw was a car of one of the relief trains Kansas sent to the Ohio flood sufferers in 1884. In the middle of the cartoon was pictured a swollen stream; on the Ohio side was shown a long-nosed, slab-sided, razor-backed elm-peeler, with starvation minutely pictured in his face; on the Kansas side stood one of Secretary Coburn's sleek, trim, well-fed "mortgage lifters," holding in his mouth a fine ear of Kansas corn and represented as saying: " 'ere's to ye." Through the energetic work of the breeder and feeder the days of the elm-peeler and razor-back are numbered, while they have brought into the foreground the modern-bred, well-developed swine of today, calling upon practical experience, the scientific leader, the plant breeder and the chemist to so lend their help in providing the proper foods for this creature of modern development that he shall grow in all his parts symmetrically, and enable his American owner to keep pace in foreign markets with his energetic Irish, Danish and Canadian competitors.

It is "ears" to his swineship that I wish to present now, which, in accepting, I feel will enable him to develop that muscular energy, that rigidity of frame, that firmness, smoothness and even quality of flesh whereby he can outdistance all competitors.

We will, therefore, study these ears from the pig-feeding side for a few moments. In this State of 229,000 farms, the statistician tells us, are 10,000,000 hogs, an average of 43 2-3 hogs per farm. He further states that the swine industry comprises nearly one fourth the value of all the live stock of the State, making the hog a most important factor of revenue to our commonwealth. Our State feeds to her stock approximately $100,000,000 worth of feed every year. Since the most important of all our feeds is corn, the "staff of life" to our swine, it is worth our while to study this feed to see how it may be made to better meet our porker's bodily requirements. Professor Henry, in his most excellent work on "Feeds and Feeding," says: "In this country corn must continue the common feeding stuff for swine."

The chemist tells us while corn is rich in carbohydrates, or fat, it is low in protein and ash. The feeder tells us that corn is the best relished grain available for domestic animals of all classes, and that their fondness for it is remarkable. In feeding tests, made by practical swine breeders in this and other states, as well as by the various experiment stations, I learn that corn in its present composition tends to produce an excess of heat, while both chemist and feeder tell us that it is too low in protein ash. Therefore the plant breeder is asked to direct his energies toward correcting this fault. All through the pork producing states the plant breeders of farm crops at the experiment stations are giving this matter earnest attention.

Just before we take a glance at their work, may we read the primary units that the feeder has given them to work upon? These units are protein, carbohydrates, fats and ash. Protein is that part of the corn that is a nitrogen compound and its digestible part is utilized by the growing animal in building up the various organic tissues of its body, giving vitality to the blood; in fact feeding the body its nitrogeneous wants. Approximately 16 per cent of the protein content is nitrogen, so fundamental to the living cell in either plant or animal life. Then we may say, with Professor Henry, "that the organic part of bones, muscles, tendons, internal organs, skin, etc., of the animal body are formed from the protein nutrients of feeding stuffs."

The carbohydrates, largely represented by the starch compounds, seem in function to give heat, store fat and in a measure aid in the normal functions of the body. The fat, or oil, of corn; contains a very large per cent of neutral fats or glycerides (over 80 per cent of the fat content) and a small per cent (6 or 7 per cent) of free or true oil. This is animal nutrition worth two and one half times as much as either the protein or starch compounds, and can be used to produce heat or lay up adipose tissue.

The ash is valuable as a bone builder and a bone renewer. The feeding tells us that young pigs require a relatively much larger proportion of ash in food than the hog, on account of the rapid and necessary development of the bony frame. For this reason we must have a corn richer in ash to meet the necessities of the young growing pig or supply it in other foods.

The plant breeder now seeks to produce for you a corn that is richer in protein and ash, accomplishing this by reducing the starch content of the kernel and increasing the protein and ash content. The work done by the chemist and plant breeder at the South Carolina, Georgia, New York, Kansas, Illinois and Iowa stations shows corn to be very susceptible to improvement, a change being made not only in physical appearance, but in chemical content as well. This is most clearly shown by the work of the Illinois Experiment Station with corn within the last seven years. This clearly shows that the chemical content can be improved by judicious and careful selection or breeding.

Permit me to next call your attention to the following facts: Corn ears have an individuality as marked as different breeds of swine, while corn kernels have as distinct types as individuals in a breed of hogs. This is what renders so valuable the dams that have received careful breeding through generations of well mated ancestors and hence evince a strong prepotency. This has led to the careful study of the principles of breeding, and we find that in the main the general principles that govern and control animal breeding hold true in plant breeding as well. In applying this to corn the row system is practiced where individual differences can best be studied and the poor strains rejected. Corn by nature cross-pollinates and therefore the male parent of individual ear is in doubt. For this reason our registrations must be based upon the dam. I here desire to present to you the plan I have formulated for carrying out an experiment to meet pig feeding requirements in corn. The work already done simply points the way for future work. From what we know of the chemical content of the kernel it would seem that the most of the oil lies within the germ.

Doctor Hopkins, of the Illinois station, states that here he finds over 85 per cent of the oil of the kernel. The hard or horny portion usually constitutes over 60 per cent of the kernel and contains a large portion of the protein that is found outside of the germ.

Professor A. D. Shamel says 25 per cent of the protein of the kernel is within the germ. The white or starchy part of the kernel, Doctor Hopkins finds to be equal to about one fifth of the whole kernel. The very poorest starch in the kernel, from the feeder's standpoint, lies just back of or underneath the germ. Hence by increasing the legnth, breadth and depth of the germ we decrease the amount of starch content and get rid of a certain amount of starch that is low in feeding value. These facts show the tremendous advantage gained by the mechanical selection of the seed. The production of hand pollination or artificial pollination has not been a great success. Detasseling is yet in its experimental stage, but seems to promise important results. Until it is fully demonstrated, the swine breeder is advised to depend upon the great law of all breeding, "Like tends to produce like," and thus select his seed and give it the soil food and culture its nature and growing habits seem to demand.

Today the glucose people call for more oil in the corn and offer 5 cents additional per bushel for every pound of oil increase per bushel. The feeder of bacon hogs calls for less oil and more protein and ash. The starch factories call for an increase in starch at the cost of other units. Thus you see varied interests demand a change in corn composition, and it is our purpose as plant breeders to meet these commercial demands, if possible. Doctor Hopkins tells us that a bushel of common field corn (weight 56 pounds), at present yields 38 pounds of starch, 7 pounds of gluten, 5 pounds corn bran or hull, 4½ pounds germ and the rest made up of water, soluble or other matter. He rates the germ as containing 40 per cent corn oil, worth 5 cents per pound, starch 1½ cents, gluten 1 cent and hull ½ cent. The average yield of corn in our State last year was 32 bushels per acre. On the chemists' basis this would yield 1,152 pounds of starch at 1½ cents, $17.28; 57.6 pounds oil at 5 cents, $2.88; 224 pounds gluten at 1 cent, $2.24; 160 pounds corn bran at ½ cent, 80 cents. Total, $23.20. Thirty-two bushels of corn at present prices—Ames market Saturday—50 cents, would yield $16 per acre.

If we breed and grow corn for a special purpose we will derive an added profit, just the same as we do from the dairy cow, the beef cow, the draft horse, the roadster and the mutton sheep. Let us not be content to grow corn, or even good corn, but let us grow corn for a special purpose. If we wish to feed corn, let us grow high protein corn to be balanced for ash and lack of full protein ration by that legume most easily grown in your locality. If we wish to grow corn for a starch factory, let us grow a corn high in starch content. If for a glucose factory, one high in oil, and thus derive the greatest profit from our crop.

Let us use the good judgment in improving our corn that is exercised in developing our swine, and then we will be able to do the greatest good to the greatest number of Iowa pigs. The matter of pedigree is of as great importance in improvement of corn as it is in improvement of pigs. The Illinois Experiment Station is growing a plot of high protein corn, each ear of which has a pedigree protein content not only of its dam and granddam, but so far back as its great-great-great-great-granddam, seven generations.

To the swine breeders of Iowa let me say, we, who are now seeking to improve the corn you feed, wish at all times to co-operate with you and will deem it a kindness if you will point out to us the corrections you think it possible for us to make in the corn you desire to feed. We want to help you to get the best corn, and the best forage, that you may continue to grow the largest hogs of the best quality and the greatest number of any State in the whole galaxy. When, if it be nothing but hogs and hominy, it will be the juiciest, best-flavored pork and the sweetest and most nourishing hominy in all the land. Then here's to King Corn, and the mortgage lifting, bank-account-making hog. May both long bless our Hawkeye prairie State and their union cause every Iowa farmer to rise up and, calling them blessed, receive the silver offering this union always brings. May peace, prosperity and pedigreed corn bless your pigs henceforth evermore, causing all doubters to move out of Missouri, establish permanently in this realm of realized fact and demonstrated profit. Then as far as this proposition is concerned, "I'm from Missouri" will be of the past.

Considerable discussion followed this paper. Facts brought out were that there were good qualities in both smooth and rough varieties of corn; that smooth sorts showed a more marked tendency to revert to original types; that experiments in detasseling had not yet reached that stage which justified positive statements as to value of results; that no definite knowledge existed as to the comparative maturing qualities of white and yellow varieties; that the ordinary period of ripening was from one hundred and twenty to one hundred and twenty-five days; that those sorts having large cob usually called for longer ripening period; that radishes were valuable as a hog food; that every man had a different opinion as to the value of the potato as hog feed.

RESOLUTIONS.

A committee on resolutions, consisting of Messrs. Howard, McTavish, Swallow, Prine and Munson, reported the following resolutions, which were adopted:

Whereas, The paper presented before this association by Secretary F. D. Coburn of the St. Louis Exposition sets forth many new and important additions and classifications of the premium list proposed for the swine department of said World's Fair, in which this association heartily concurs, and

Whereas, This association's attention having been called to the construction and size of the new swine pavilion now being erected at the

Iowa State Fair grounds, and as it is our earnest desire that said pavilion may afford ample room for the proper showing and judging of swine, and

Whereas, This association, at its last fall's meeting, recommended that a new class for swine 18 months old, both in individual classes and in herds, be added to the Iowa State Fair premium list and in order to put in this new class that the grand sweepstakes herd prize, all breeds competing, be discontinued, and

Whereas, The growing and improvement of our corn crops is so closely allied to the proper feeding of the hog, be it therefore

Resolved, First—That we heartily endorse the classifications proposed by Secretary F. D. Coburn for the coming swine show at St. Louis.

Second—That it is the sense of the association that more room is necessary for the display and judging of swine in the new pavilion and that we respectfully recommend that seats be not constructed more than half way around said pavilion.

Third—That it is the sense of this association that inasmuch as the State fair board has granted the latter part of our request we respectfully request that the 18-months class be added to the premium list.

Fourth—That this association shall hereafter devote a part of its time to the study of the best means of improving our corn crop.

Among those in attendance were: A. G. Munson, Maxwell; Strater Bros., Monroe; Dr. T. B. Hammer, Des Moines; Wilson Rowe, Ames; F. H. Houghton, Marshalltown; Harvey Johnson, Logan; W. Z. Swallow, Waukee; Charles Swallow, Waukee; Alonzo Baker, Colon; W. A. Jones, Van Meter; W. D. McTavish, Coggon; W. J. Kinzer, Ames; Mr. Watson, Madrid; E. B. Watson, Ames; George S. Prine, Oskaloosa; D. L. Howard Jefferson; W. L. Willey, Menlo; T. W. Miller, Menlo; F. F. Failor, Newton; O. W. Browning, Newton; S. W. Lee, Wick; B. R. Vale, Bonaparte; W. S. Hart, Panora; C. S. Hammer, Indianola; Turner & Son, Maxwell; Albert Sundell, Boxholm, all of Iowa.

PART IV.

EXTRACTS FROM THE STATE DAIRY COMMISSIONER'S REPORT FOR 1903.

H. R. Wright, Dairy Commissioner.

The condition of the dairy business in the State is not all that could be desired. As frequently pointed out in these reports, the dairy business booms when other lines of agriculture return but meager profits. During the year up to 1898, prices of farm products other than butter were extremely low and uncertain. From and including 1898, prices of other farm products have been very high. This is the chief factor which accounts for the present ebb in the dairy business. Without doubt, the introduction of the hand separator and the centralizing plants have reduced the output of creamery butter in this State, as is pointed out elsewhere in this report under the discussion of hand separator statistics. One of the striking features which the statistics of the last several years show is that the number of skimming stations in Iowa is steadily and rapidly decreasing.

In the boom times of creamery building, beginning about 1896 and before the advent of the hand separator and the system of shipping cream by rail from patron to creamery, about the only method by which a creamery could increase its product was by the use of the skimming station system. There have been a number of disastrous failures of the creamery companies that have operated a central plant and numerous skimming stations. There have been other failures, more or less complete and equally disastrous in the aggregate, of smaller concerns with only a few skimming stations each. If one may judge the future by the past history of the skimming station idea, it seems to be only a question of a few years until the skimming station will be a thing of the past. It is difficult to make a general statement that will apply in every case, but it seems entirely safe to assert that it is bad policy at this time to invest any money in a skimming station. If there is patronage enough at any point to warrant the building of a skimming station, the patronage will be entirely sufficient to warrant the erection of a co-operative creamery. The difference in expense between building a skimming station and a creamery is very small and the difference in expense in operating them is still less.

There are two creameries in the State, within fifty miles of each other and operating under very similar conditions, but upon entirely different plans. Each of them has about six hundred patrons, but one of them has not only a churning plant, but eight skimming stations. This creamery has an investment in the creamery of $5,000.00 and reports the average value of the skimming stations at $2,500.00, which makes the total investment $25,000.00. This creamery makes 175,000 pounds of butter. The other creamery has an investment of $5,000.00 in the creamery and makes 540,000 pounds of butter. It is evident that the expense in the first of these plants must include the wages of eight skimming station operators, as well as the wages of the men who operate the churning plant, and hence the expense of operating this system of skimming stations will be very much larger than the expense of operating the other creamery, which makes three times as much butter. And it is evident that when two creameries such as these get into competition, that the creamery with the skimming stations must certainly give way to the creamery that has no skimming stations.

The creamery operator who invests his money in a skimming station, in a very large number of cases, is almost certain to lose a large part of his investment.

A large number of centralizing plants are now in operation in this State and a still larger number are apparently about to be built, and the question to be settled in the dairy business of Iowa is whether these plants will take the place of the smaller creameries of the State.

OLEOMARGARINE.

The new national oleomargarine law has been in force since July 1, 1902, so that statistics are at hand for the year ending June 30, 1903. The make of oleomargarine for the year just preceding the new national law was 126,315,427 pounds. For the first year under the new law the make was 71,211,344 pounds, a decrease of 55,104,183 pounds, or 44 per cent. The following table shows the number of fifty-pound tubs of oleomargarine made during September in the Chicago oleo factories:

Months.	1903	1902	1901
July	18,562	53,100	75,849
August	22,360	27,800	63,268
September	34.096	37,100	80,594

The total make for the whole United States for the months of July and August during the last three years has been as follows:

1901	15,814,835 pounds.
1902	9,002,054 pounds.
1903	5,795,125 pounds.

A careful study of the foregoing figures will show clearly that there has been a very great decrease in the amount of oleomargarine made in the United States, and that the decrease seems to be more and more the longer the law is in effect. For many years the opponents of the oleomargarine traffic have been putting forth the claim that there was a small legitimate trade for oleomargarine sold as such, but that the bulk of the oleomargarine trade was only possible when the oleomargarine was colored in imitation of butter and sold so that the ultimate consumer was deceived into thinking that it was butter. The figures from the internal revenue department given above seem to prove that this assertion is borne out by the decreased sale of so-called "uncolored oleomargarine" even when the oleomargarine was given a slight yellow color, as has been the case wtih most oleomargarine put on the market since July 1, 1902.

It was to be expected that manufacturers of oleomargarine would make every effort to avoid the regulations and restrictions of the new law and that they would also use every legal means to weaken the value of the law by adverse court decisions. A number of expedients were resorted to by them, but the only one that seemed to be effective was the use of palm oil in very small quantities. This was successful in evading the spirit of the law until a chemist was found who could detect in the oleomargarine the small quantity of palm oil that had beeen used.

Following the discovery that certain manufacturers of oleomargarine had been using palm oil, the internal revenue department assessed against a number of them very large sums under the feature of the law which requires the payment of ten cents per pound on oleomargarine having in it any "artificial coloration." These sums of money they have been obliged to pay and they are now suing the government for the return of the money so paid, and these suits, of course, raise all the points that have been urged against the oleomargarine law, and the determination of them will go very far towards settling the exact meaning of the law and determining the future effect of it. In the meantime the make of oleomargarine decreases still more because the manufacturers are not using the palm oil now as it is alleged by the department of internal revenue they were doing last year.

The oleomargarine interests have also succeeded in getting a case before the Supreme Court of the United States on appeal from the United States District Court, Southern District of Ohio, the determination of which will have a very important bearing on the future success of the law. While it is true that the law has been a large part of what its supporters hoped for and that the enforcement of it has been rigidly carried out by the internal revenue department, and all the suits under this law so far have been determined in favor of the support of the law, yet it is also true that the butter interests should not now give up the fight against oleomargarine, and must be warned against assuming that the battle for honesty in the sale of both butter and oleomargarine has been won. The oleomargarine interests are, as always, well supplied with money and loth to give up a business that has made them wealthy, and they are certain to use every possible means to avoid the enforcement of the law, to weaken its effect by adverse court decisions and if possible to have some of its obnoxious features repealed. The dairy interests should be more than ever on guard so that we shall not lose what has been obtained by most strenuous efforts during the past four or five years. The National Dairy Union and its officers, who have led in the fight for the recent oleo law, have proved themselves to be not only earnest but successful opponents of enemies of the dairy industry. For reasons of self-interest the organization ought to receive the active financial support of every man who believes that oleomargarine ought to be sold for what it is, and not, as has been the case for so many years, sold for and in the place of butter.

For a considerable number of years there have been scarcely any retail dealers in the State of Iowa; not more than two or three licenses have been issued each year. The reason for this is that it was extremely easy in Iowa to convict a man for the sale of colored oleomargarine, and practically all the oleo put on the market was of this variety, hence, no dealer would take out a license if he fully understood the Iowa law, and the fact that the dairy commissioner would certainly find him out and easily succeed in having him fined for selling yellow oleomargarine. As a result of the effort made by all manufacturers of oleomargarine immediately after the new law went into effect and of their representations and misrepresentations to Iowa dealers in regard to the Iowa law, a large number of grocery and meat market men in all parts of Iowa, but principally in the large cities, took out licenses for the sale of oleomargarine. It will be remembered that the new law reduced the retailer's license fee from $48.00 a year to $6.00 a year. Two hundred and five licenses were issued in Iowa in the year ending June 30, 1903. It was early discovered that only a few of the dealers that had taken out licenses were selling any large quantities of oleomargarine. It was not thought best to make any crusade against the retailers, but rather to make one case against a prominent dealer who would be certain to oppose prosecution and if possible to have the case carried to the supreme court and a decision rendered on that feature of our law which is held to forbid the sale of oleomargarine "having a yellow color." There is no question in regard to any State law which forbids the sale of oleomargarine which has been artificially colored in imitation of butter, but there seems to have been no decision rendered by any court of last resort which bears directly upon the part of the Iowa law mentioned above. Early in January the dairy commissioner purchased from the Armour Packing Company in the city of Des Moines a quantity of uncolored oleomargarine, which, nevertheless, had a considerable tinge of yellow, and after some effort an indictment was secured charging the Armour Packing Company with having sold oleomargarine "having a yellow color." The commissioner was assured that the Armour Packing Company was as anxious as himself to have the supreme court pass upon this feature of the law at the earliest date possible. However, this desire on the part of the Armour Packing Company has not prevented their attorneys from using every technical means to delay the suit. The first trial of the case resulted in a disagreement of the jury; a jury under peculiar instructions. The second trial, before the same judge, but with slightly different instructions to the jury, resulted in a conviction. The Armour Packing Company then interposed an objection to the form of the indictment, an objection which had nothing whatever to do with the meaning of the oleo law, but was simply a technical error in wording the indictment which compelled the court to set aside the verdict. Instead of dismissing the case, as he might have done, the judge sent the indictment back to the grand jury for correction. On the meeting of the grand jury in September the indictment was again returned and again objected to by the attorneys for the Armour Packing Company, and up to this date, November 1st, the case has not come to trial. However, upon convicting the Armour Packing Company the dairy commissioner sent out the following circular to the 205 dealers in the State:

Des Moines, Iowa, May 12, 1903.

Dear Sir,—From the records of the Internal Revenue office I understand you are selling so-called "uncolored" oleomargarine, and this letter is addressed to you for your information in regard to the laws of this State governing the sale of oleomargarine, or substitute for butter.

One of the provisions of the law is that the substitute for butter sold must not have a yellow color, and this department holds that this provision means that it must not have any shade of yellow. In order that the courts might pass upon this phase of the law a test case was made against the Armour Packing Company in Des Moines upon the sale of a tub of "uncolored" oleomargarine, which nevertheless had a slight shade of yellow color. On May 8th this corporation was convicted on an indictment charging the sale of oleomargarine "having a yellow color."

It is the duty of the dairy commissioner to enforce the law against the sale of oleomargarine in this State. I have refrained from making suits against the numerous dealers until this test case could be decided. This case having resulted in conviction, I am sending you this statement, in the belief that you will, without further efforts on the part of this office, desist from selling oleomargarine having any shade of yellow color, whether it be called "colored" or "uncolored." Respectfully,

H. R. Wright,
Dairy Commissioner.

A considerable number of the men who held licenses in the State answered this circular, saying that the sale of oleomargarine was not a success with them and had been only an experiment, the result of which would prevent them from attempting the sale of oleomargarine in the future. On October 15, 1903, there was not a single license for the sale of oleomargarine held in the Northern District of Iowa, and only six in the Southern District of Iowa. There will doubtless be a few more licenses taken out before next July. The Dairy Commissioner hopes to secure a final conviction in the case mentioned above, and a supreme court interpretation of the law which will support the contention that a man may not sell oleomargarine in Iowa if it has a yellow color.

RENOVATED BUTTER.

LIST OF RENOVATED BUTTER FACTORIES.

County.	Location.	Firm Name.	Post Office Address.
1 Calhoun	Rockwell City	Andrew Wood Co	Rockwell City
2 Clayton	McGregor	The J. D. Bickel Produce Co	McGregor
3 Dallas	Redfield	Smith Produce Co	Redfield
4 Des Moines	Burlington	Iowa Grain & Produce Co.	Burlington
5 Dickinson	Spirit Lake	The Stevens Co	Spirit Lake
6 Keokuk	Keota	Keota Produce Co	Keota
7 Lee	Keokuk	Iowa Pure Butter Co	Keokuk
8 Polk	Des Moines	E M. Ellingson Co	Des Moines
9 Polk	Des Moines	Schermerhorn-Shotwell Co.	Des Moines
10 Polk	Des Moines	MacRae Bros	Des Moines
11 Wayne	Humeston	Jas. L. Humphrey, Jr	Humeston
12 Washington	Washington	T. L. Emry & Son	Washington
13 Woodbury	Sioux City	N. R. Hathaway	Sioux City

The foregoing table shows the names and locations of the thirteen process butter factories of the State of Iowa. All of these factories have been in operation for the year ending July 1, 1903, and have made to this office quite complete reports of the amount of business done, and the table given below shows the aggregate for the State. For obvious reasons the amount of business done by each factory is not given. It is sufficient to say that the product of these factories ranges in amount from fifty thousand pounds to two million two hundred and fifty thousand pounds each, and that seven of them put out half a million pounds of butter each, annually.

Butter.	Year ending July 1, 1902—reports from nine factories.	Year ending July 1, 1903—reports from thirteen factories.
Pounds of renovated butter made	4,530,388	9,193,450
Average per factory	503,376	707,188
Sold for consumption in Iowa	991,333	2,168,276
Shipped outside the State	3,539,055	7,025,174

It is impossible to state just how much of the stock from which this butter was made was produced in Iowa, for the reason that some of it changes hands a number of times before it comes to the process factory and so the renovator cannot tell the origin of the butter. Perhaps not more than one third of it is Iowa butter originally.

NATIONAL STATISTICS.

Number of pounds of renovated butter made	54,658,790
Total number of factories, about	63

The managers of these factories have shown a disposition to obey in all its features the United States Renovated Butter Law, although they have objected very strenuously to some features of the law, as well as some of the rulings of the Secretary of the Treasury and the Secretary of Agriculture. Their business, moreover, shows a remarkable increase over the business done in the previous year. Attention is called to the fact that the figures for the year ending 1903 are statistics for the first year under the new renovated butter law and the figures for the year ending July 1, 1902, are the statistics for the year immediately preceding the operation of the United States Renovated Butter Law. This large increase is doubtless due to the fact that before the law went into effect butter was renovated in a small way by a very large number of factories. The taxing feature of the law has served to concentrate the business in the hands of the larger operators, as will be clearly shown by the average product of the thirteen factories of the State. There is every reason to believe that the business of renovating butter and selling the same is one of the most profitable branches of the dairy industry at the present time. In this connection there is given herewith a letter from the Secretary of Agriculture to the Secretary of the National Association of the Process Butter Manufacturers in answer to a request on the part of the process butter manufacturers that the word "process" might be substituted for the word "renovated" in branding the product when it is put upon the market. Further experience has shown that the Secretary of Agriculture is right at least when he says "Evidence is constantly accumulating that full and cordial compliance with the existing regulations is no real impediment to the business. . . . . Those who keep the name 'renovated butter' most prominent in all their transactions and especially in the retail trade, are now doing the best business."

The prices of renovated butter for the year ending November 1, 1903, are shown in the table below and compared with the prices of creamery butter.

Date.	Renovated butter.	Creamery extras.
November, 1902	21.0 c.	26.5 c.
December, 1902	21.9 c.	29.2 c.
January, 1903	21.5 c.	27.62c.
February, 1903	18.87c.	26.0 c.
March, 1903	18.80c.	28.60c.
April, 1903	18.87c.	27.25c.
May, 1903	18.0 c.	22.0 c.
June, 1903	18.40c.	21.60c.
July, 1903	17.75c.	20.12c.
August, 1903	17.0 c.	19.40c.
September, 1903	17.0 c.	20.75c.
October, 1903	17.0 c.	21.0 c.

SHOWING AVERAGE MONTHLY PRICE OF FANCY WESTERN CREAMERY BUTTER IN NEW YORK MARKET.

Month.	Twelve months ending Nov. 1, 1895.	Twelve months ending Nov. 1, 1896.	Twelve months ending Nov. 1, 1897.	Twelve months ending Nov. 1, 1898.	Twelve months ending Nov. 1, 1899.	Twelve months ending Nov. 1, 1900.	Twelve months ending Nov. 1, 1901.	Twelve months ending Nov. 1, 1902.	Twelve months ending Nov. 1, 1903.
November	$ .2510	$ .2330	$ .2112	$ .2325	$ .2337	$ .2600	$ .2487	$ .2412	$ .2650
December	.2440	.2500	.2250	.2290	.2160	.2720	.2540	.2510	.2920
January	.2519	.2266	.1900	.2040	.1975	.2650	.2262	.2425	.2762
February	.2394	.20[illegible]0	.2050	.2042	.2100	.2500	.2250	.2862	.2600
March	.2670	.2185	.1900	.1937	.2075	.2550	.2212	.2840	.2860
April	.2000	.1650	.1880	.1980	.1962	.1960	.2099	.2825	.2725
May	.1785	.1572	.1530	.1580	.1790	.2012	.1900	.2275	.2200
June	.1794	.1550	.1500	.1687	.1881	.1950	.1925	.2195	.2160
July	.1770	.1505	.1500	.1687	.1835	.1960	.1960	.2131	.2012
August	.1980	.1571	.1675	.1860	.2000	.2100	.2050	.1990	.1940
September	.2125	.1600	.1930	.2025	.2262	.2150	.2110	.2170	.2075
October	.2294	.1850	.2290	.2235	.2400	.2[illegible]90	.2200	.2362	.2100
Average value per lb. for each year	$ .2190	$ .1882	$ .1885	$ .1971	$ .2065	$ .2278	$ .2165	$ .2416	$ .2417

THE PRODUCT OF IOWA'S CREAMERIES.

It is impossible to get complete returns from all the creameries. The following table shows the figures of milk and cream received and butter made at six hundred and one of the six hundred and sixty-one creameries of the State, and in a general way at least shows the relative amount of milk and cream produced and brought to the creameries in each county. The reports show very generally that four pounds of cream are necessary to make one pound of butter and so about seventeen million five hundred thousand pounds of butter, or about 29 per cent of all that was reported, was made from cream instead of from milk.

TABLE SHOWING NUMBER OF POUNDS OF MILK RECEIVED, NUMBER OF POUNDS OF CREAM RECEIVED, POUNDS OF BUTTER MADE, POUNDS SOLD TO PATRONS IN IOWA AND SHIPPED OUTSIDE THE STATE, SO FAR AS REPORTED BY THE CREAMERIES.

Counties.	Number reporting.	Pounds of milk received.	Pounds of cream received.	Pounds of Butter Made and Market for Same.				
				Number reporting.	Pounds made.	Pounds sold to patrons.	Pounds sold in Iowa.	Pounds shipped out of the state.
THE STATE	601	975,906,837	69,626,449	601	59,642,487	3,924,489	3,945,978	51,772,020
Adair	8	18,781,326	183,359	8	855,826	25,902	19,411	810,513
Adams	1	3,000,000	13,000	1	120,000	1,200	1,920	116,880
Allamakee	6	11,428,020	2,523,858	6	1,167,578	36,977	21,115	1,109,386
Audubon	11	20,286,055	471,849	11	994,103	78,663	3,250	912,190
Benton	3	9,530,918	112,713	3	374,095	7,146	21,820	345,129
Black Hawk	14	24,987,484	2,736,387	14	1,287,458	207,467	243,073	896,918
Boone	3	5,664,876	488	3	244,264	12,006	34,110	198,148
Bremer	20	63,590,159	6,238	20	2,887,263	253,344	57,233	2,506,686
Buchanan	11	46,653,180	990,774	11	2,265,786	171,925	75,593	2,018,268
Buena Vista	4	8,253,754	239,030	4	427,927	19,711	16,681	391,535
Butler	17	38,292,174	591,590	17	1,864,287	128,760	77,084	1,658,443
Calhoun	6	5,561,360	248,709	6	399,696	19,572	19,239	360,885
Carroll	11	9,133,887	17,553	11	453,770	18,448	4,517	430,805
Cass	2	392,904	3,784	2	15,804	300	.. ....	15,504
Cedar	7	5,091,240	703,132	7	459,937	19,479	89,863	347,595
Cerro Gordo	4	1,983,789	679,884	4	264,924	7,872	28,447	228,606
Cherokee	5	2,063,682	250,076	5	149,127	2.388	13,815	132,924
Chickasaw	16	34,405,713	5,131,096	16	2,680,175	197,544	72,887	2,555,518
Clay	7	11,098,614	80,336	7	523,930	39,623	23,743	460,564
Clayton	17	38,538,113	4,588,771	17	2,293,068	88,640	11,931	2,192,497

POUNDS OF MILK RECEIVED, ETC.—CONTINUED.

Counties.	Number reporting.	Pounds of milk received.	Pounds of cream received.	Pounds of butter made and market for same.				
				Number reporting.	Pounds made.	Pounds sold to patrons.	Pounds sold in Iowa.	Pounds shipped out of the state.
Clinton	10	13,613,748	474,000	10	683,491	13,640	68,261	601,590
Crawford	2	438,383	264,054	2	87,220	1,256	511	85,553
Dallas	4	9,396,047	40,990	4	402,376	18,828	105,873	277,675
Davis	1	845,307	....	1	33,688	804	5,540	27,344
Decatur	1	160,000	45,000	1	28,800	5,675	300	22,825
Delaware	22	63,839,256	128,484	22	2,823,569	258,432	220,577	2,344,556
Dickinson	4	4,604.587	260,372	4	265,229	30,336	24,680	210,213
Dubuque	18	29,181,880	6,150	18	1,378,021	96,445	114,615	1,166,961
Emmet	8	9,028,547	306,877	8	478,160	43,454	8,499	426,207
Fayette	20	57,586,164	351,937	20	2,625,556	263,501	153,541	2,208,514
Floyd	5	....	2,941,478	5	710,836	36,316	16,319	658,196
Franklin	6	10,971,377	301,432	6	496,967	30,699	12,474	453,796
Greene	3	2,079,447	25,195	3	89,806	1,269	38,243	50,294
Grundy	8	16,745,241	404,532	8	794,009	71,299	12,916	709,794
Guthrie	7	14,488,231	216,338	7	751,499	29,103	55,064	667,282
Hamilton	6	12,995,277	117,421	6	608,023	54,117	4,419	549,457
Hancock	8	6,147,433	556,870	8	382,408	15,515	3,429	363,464
Hardin	11	20,632,971	643,071	11	1,019,113	73,287	34,179	911,647
Harrison	2	2,355,659	1,200	2	103,427	10,580	48,694	44,153
Henry	1	689,549	....	1	33,597	1,419	825	31,353
Howard	9	13,635,871	1,953,859	9	1,983,322	36,243	1,396	1,045,683
Humboldt	11	10,635,025	869,722	11	678,056	59,482	1,166	617,408
fda	2	8,016,301	345,637	2	205,701	4,460	2,000	199,141
Iowa	8	12,183,468	1,189,746	8	791,516	185,748	69,114	536,654
Jackson	11	16,327,989	477,505	11	785,125	21,889	32,370	730,865
Jasper	4	4,801,488	95,624	4	234,179	11,780	8,152	214,247
Jefferson	4	1,812,192	2-5,560	4	145,065	7,785	24,260	113,020
Johnson	1	....	87,248	1	24,307	....	....	24,307
Jones	13	51,393,619	506,391	13	2,331,521	163,465	113,289	2,054,767
Keokuk	3	448,970	138,694	3	51,850	204	....	51,646
Kossuth	20	35,653,208	902,665	20	1,908,137	188,842	66,698	1,652,597
Linn	17	24,980,087	80,209	17	1,556,310	64,466	128,444	963,410
Louisa	1	....	72,000	1	1,800	....	5,000	13,000
Lucas	1	22,500	....	1	1,112	90	1,022	....
Lyon	4	771,675	507,292	4	121,322	2,467	9,605	109,450
Mahaska	2	562,639	280,000	2	99,757	3,564	28,564	57,621
Marion	1	....	167,176	1	42,822	....	13,978	28,844
Marshall	6	5,720,222	1,978,994	6	658,746	20,062	31,221	607,453
Mitchell	10	1,504,040	5,479,775	10	1,798,183	51,720	318,315	1,428,148
Monona	1	....	12,853	1	3,714	67	130	3,517
Monroe	1	1,831,800	....	1	52,292	2,868	13,464	36,960
Montgomery	1	850,000	30,000	1	46,828	3,000	13,828	3,000
Muscatine	2	300,000	469,200	2	123,900	1,100	43,400	79,400
O'Brien	4	4,992,317	281,815	4	295,607	71,720	20,777	208,110
Osceola	2	2,450,000	103,031	2	135,572	220	2,024	133,326
Page	3	2,176,700	1,017,425	3	346,607	2,900	82,000	261,707
Palo Alto	14	32,524,788	1,135,501	14	1,801,018	186,201	75,572	1,539,245
Plymouth	4	7,067,936	221,784	4	370,218	21,925	7,332	350,961
Pocahontas	7	2,618,579	957,672	7	391,311	10,711	4,605	375,995
Polk	4	2,620,429	1,970,588	4	629,193	11,232	354,919	263,642
Pottawattamie	3	1,054,225	269,996	3	114,015	4,898	28,426	80,691
Poweshiek	4	2,532,126	826,120	4	324,780	4,906	45,320	274,554
Ringgold	1	135,202	....	1	5,116	529	....	4,587
Sac	8	8,157,866	1,471,849	8	689,025	41,013	42,404	605,606
Scott	2	657,000	410,000	2	131,380	1,200	89,000	441,180

POUNDS OF MILK RECEIVED, ETC.—CONTINUED.

Counties.	Number reporting.	Pounds of milk received.	Pounds of cream received.	Pounds of butter made and market for same.				
				Number reporting.	Pounds made.	Pounds sold to patrons.	Pounds sold in Iowa.	Pounds shipped out of the state.
Shelby	7	8,746,092	889,087	7	587,016	38,941	2,742	545,333
Sioux	5	1,776,728	1,526,169	5	592,530	5,569	14,278	572,684
Story	12	2 ,542,343	407,916	12	992,620	103,209	168,767	720,644
Tama	5	1,307,315	1,371,001	5	403,917	1,504	2,641	405,762
Taylor	2	1,339,730	2,196,330	2	618,685	2,200	10,000	606,485
Union	2	3,031,374	101,928	2	168,000	7,875	7,608	152,607
Van Buren	2	....	227,420	2	56,855	500	900	47,355
Wapello	2	1,855,790	4,349	2	80,011	1,800	28,486	48,725
Warren	2	1,985,000	....	2	83,050	3,750	23,050	56,250
Washington	5	3,267,066	1,028,912	5	293,085	2,616	64,112	324,357
Wayne	1	4,103,734	....	1	172,666	3,000	....	169,866
Webster	4	3,728,758	524,138	4	248,972	7,896	37,036	204,040
Winnebago	9	21,920,535	481, 13	9	1,011,717	117,484	20,477	873,756
Winneshiek	16	920,000	6,238,920	16	1,592,451	20,157	85,446	2,486,848
Woodbury	2	....	1,173,020	2	341,607	4,276	4,276	332,055
Worth	10	12,261,638	1,089,550	10	823,797	64,958	15,516	743,322
Wright	6	1,301,180	1,313,381	6	356,307	23,101	15,348	3 7,558
THE STATE	601	975,906,837	69,626,444	601	59,642,487	3,924,489	3,945,978	51,772,020

Average make of butter per creamery, 97,770 pounds. On this basis the 661 creameries of the state make 64,565,970 pounds.

COMPARISON BY YEARS.

Ending May 1—	1900.	1901.	1902.	1903.
Average pounds of butter per creamery.	104,918	105,491	104,152	97,770
To all pounds of butter for all creameries.	84,965,062	82,704,944	77,88 ,696	64,565,970

Of the creamery butter made, 15.4 per cent was consumed in Iowa.
The figures for 1903 are for the year ending July 1st.

RAILWAY BUTTER SHIPMENTS.

The tables of railway butter shipments represent the shipments of butter to points outside the State, and are for the year ending September 30, 1903. Creamery butter statistics printed in this report are for the year ending July 1, 1903. The creamery butter figures are partly estimated from the reports of creameries so far as received. The railway butter shipments are reports direct from the railroads of the State. The latter reports are, therefore, considered very accurate, and the former somewhat subject to inaccuracy. Particularly this year, the creamery butter figures are low on account of the closing of so large a number of creameries, which materially affects the estimate of the total product for the State.

Not all the butter here reported is made in Iowa. It is true that we do not import butter for consumption, but considerable quantities of low grade butter are annually imported to be made into renovated butter or resold outside the State. Sioux City, in Woodbury county, has a large renovated butter factory and is also a center for the collection of packing stock and renovated butter stock. Naturally, a large part of this butter comes from South Dakota and Nebraska. These facts and the fact that Sioux City also has the largest creamery in the State, account for the great increase in the total butter shipped from Woodbury county. A like thing is true in regard to Polk county, which has three renovated butter factories and two large creameries, located in the city of Des Moines. Clayton and Dickinson counties, showing large gains in butter shipments, each have renovated butter factories. The stock from which renovated butter is made comes largely from outside the State, and so the total shipments from these counties do not represent at all the amount of butter made in the counties.

The shipping of cream to the larger plants is accountable for some of the changes in county totals. It therefore happens that the figures in scarcely a single case represent even approximately the amount of butter produced in a county and shipped from it.

This department is under great obligations to the railways of the State that have made reports of butter shipments at considerable expense of time and effort.

TABLE SHOWING NUMBER OF CREAMERIES—GROSS POUNDS OF BUTTER SHIPPED OUT OF STATE.

Counties.	Number of Creameries for 1902 and 1903.		Gross Pounds of Butter Shipped Out of the State for the Years Ending September 30, 1902, and 1903, Showing Increase and Decrease by Counties.			
	1902	1903	1902	1903	Increase.	Decrease.
THE STATE	919	661	*85,854,721	91,761 661	13,912,417	8,005,477
Adair	13	13	846,409	592,912	....	253,497
Adams	6	3	444,431	171,643	....	272,788
Allamakee	7	7	1,304,818	1,489,747	184,929	....
Appanoose	......	......	70,737	113,367	42,630	....
Audubon	11	11	1,090,121	990,537	....	99,584
Benton	13	10	600,097	797,321	197,224	....
Black Hawk	20	17	1,847,781	1,494,874	....	352.907
Boone	7	4	103,517	71,617	....	31,900
Bremer	22	21	2,878,128	2,496,880	....	381,248
Buchanan	18	17	3,191,442	2,442,670	....	748,772
Buena Vista	10	7	1,026,794	1,094,595	67,801	....
Butler	21	20	2,318,258	1,827,661	....	490,587
Calhoun	10	8	1,417,367	1,574,950	157,583	....
Carroll	13	12	1,193,172	1,520,613	327,441	....
Cass	10	7	370,228	226,102	....	144,126
Cedar	9	9	443,197	418,508	....	24,689
Cerro Gordo	6	7	788,204	645.449	....	142,755
Cherokee	7	4	129,246	171,463	42,217	....
Chickasaw	19	18	2,715,724	2,619,271	....	96,553
Clarke	4	......	17,000	18,755	1,755	....
Clay	13	8	665,572	614,318	....	51,254
Clayton	20	18	2,980,386	3,916,094	935,708	....
Clinton	17	15	1,180,200	660,676	....	519,524
Crawford	5	3	1,079,005	958,798	....	120,207
Dallas	10	8	877,279	731,682	....	145,597
Davis	5	4	133,615	47,157	....	86,458
Decatur	4	5	22,757	125,640	102,883	....
Delaware	35	26	2,672,243	2,967,206	294,963	....
Des Moines	......	......	295,926	301,670	5,744	....
Dickinson	5	4	641,590	1,201,551	559,961	....
Dubuque	20	23	2,322,444	2,738,755	416,311	....
Emmet	11	8	773,618	854,436	80,818	....
Fayette	20	19	2,448,793	2,494,653	45,860	....
Floyd	7	6	959,608	924,558	....	35,050
Franklin	12	10	534,164	372,920	....	161,244
Fremont	1		3,432	3,868	436	....
Greene	6	4	284,813	230,652	....	54,161
Grundy	14	10	675, 55	703,698	28,143	....
Guthrie	17	15	1,218,177	1,180,018	....	38,159
Hamilton	11	13	1,170,630	1,654,582	483,952	....
Hancock	12	12	548,176	461,156	....	87,020
Hardin	17	16	1,835,521	1.629,760	....	20 ,761
Harrison	5	2	411,383	340,375	...	71,008
Henry	3	1	71,468	84,423	12,855	....
Howard	10	9	1,433,452	1,360,360	....	73,092
Humboldt	12	11	888,985	794,480	....	94,505
Ida	3	2	307,980	214,290	....	93,690
Iowa	12	10	616,428	693,689	76,961	....
Jackson	20	16	1,141,627	1,408,303	266,676	....
Jasper	8	6	255,717	297,360	41,643	....

TABLE SHOWING NUMBER OF CREAMERIES—GROSS POUNDS OF BUTTER SHIPPED OUT OF STATE—CONTINUED.

Counties.	Number of Creameries for 1902 and 1903.		Gross Pounds of Butter Shipped Out of the State for the Years Ending September 30, 1902, and 1903, Showing Increase and Decrease by Counties.			
	1902	1903	1902	1903	Increase.	Decrease.
Jefferson	5	4	97,937	110,752	12,815	
Johnson	3	2	211,461	124,706		86,755
Jones	30	25	4,034,175	3,926,063		108,112
Keokuk	7	3	292,992	438,281	145,289	
Kossuth	22	22	1,955,559	1,782,170		173,389
Lee			816,293	234,006		582,287
Linn	25	22	1,192,201	1,507,483	315,282	
Louisa	2	1	63,910	51,449		12,461
Lucas	2	2				
Lyon	6	5	378,184	234,374		143,810
Madison			11,435	25,668	14,233	
Mahaska	2	2	99,319	692,563	593,244	
Marion	2	3	72,861	67,550		5,311
Marshall	8	6	605,221	526,492		78,729
Mills	4	3	6,310	14,961	8,651	
Mitchell	11	10	1,884,063	1,577,956		306,107
Monona		1	44,867	60,795	15,928	
Monroe	1	1	41,715	58,667	16,952	
Montgomery	4	1	115,797	149,658	33,861	
Muscatine	3	2	88,619	123,118	34,499	
O'Brien	5	5	626,465	678,065	51,600	
Osceola	5	3	231,160	305,169	74,009	
Page	4	3	672,674	2,103,922	1,431,248	
Palo Alto	20	15	1,668,391	1,534,245		144,146
Plymouth	10	6	555,840	464,980		90,860
Pocahontas	12	8	802,024	644,998		157,026
Polk	4	5	2,073,365	3,224 270	1,150,905	
Pottawattamie	7	8	564,360	324,894		239,466
Poweshiek	6	7	406,335	407,818	1,483	
Ringgold	2	2	20,516	12,307		8,209
Sac	13	11	849,046	699,777		149,269
Scott	3	2	258,700	326,831	68,131	
Shelby	12	10	709,450	231,351		478,099
Sioux	7	6	614,462	944,706	330.244	
Story	14	14	1,355,452	1,388,206	32,754	
Tama	9	5	671,110	545,905		125,205
Taylor	4	2	200,203	518,096	317,893	
Union	14	9	695,700	638,011		57,689
Van Buren	5	3	36,350	96,813	60,463	
Wapello	1	3	177,359	137.107		40,252
Warren	5	3	13,400			13,400
Washington	5	5	276,575	403,126	126,551	
Wayne	4	4	633,752	794,455	160,703	
Webster	7	5	493,382	659,325	165,943	
Winnebago	15	16	1,298,302	1,105,416		192,886
Winneshiek	15	17	1,508,563	2,156,992	648,429	
Woodbury	3	3	*3,994,627	7,520,139	3,325,512	
Worth	12	12	958,253	861,036		97,217
Wright	8	7	728,671	791,216	62,545	
THE STATE	919	661	85,854,721	91,761,661	13,912,417	8,005,477

Net increase, gross pounds, 5,906,940.

* Error in statement from Woodbury county last year reduces the figures from that county and from the State by 210,261 pounds. The figures here given are correct.

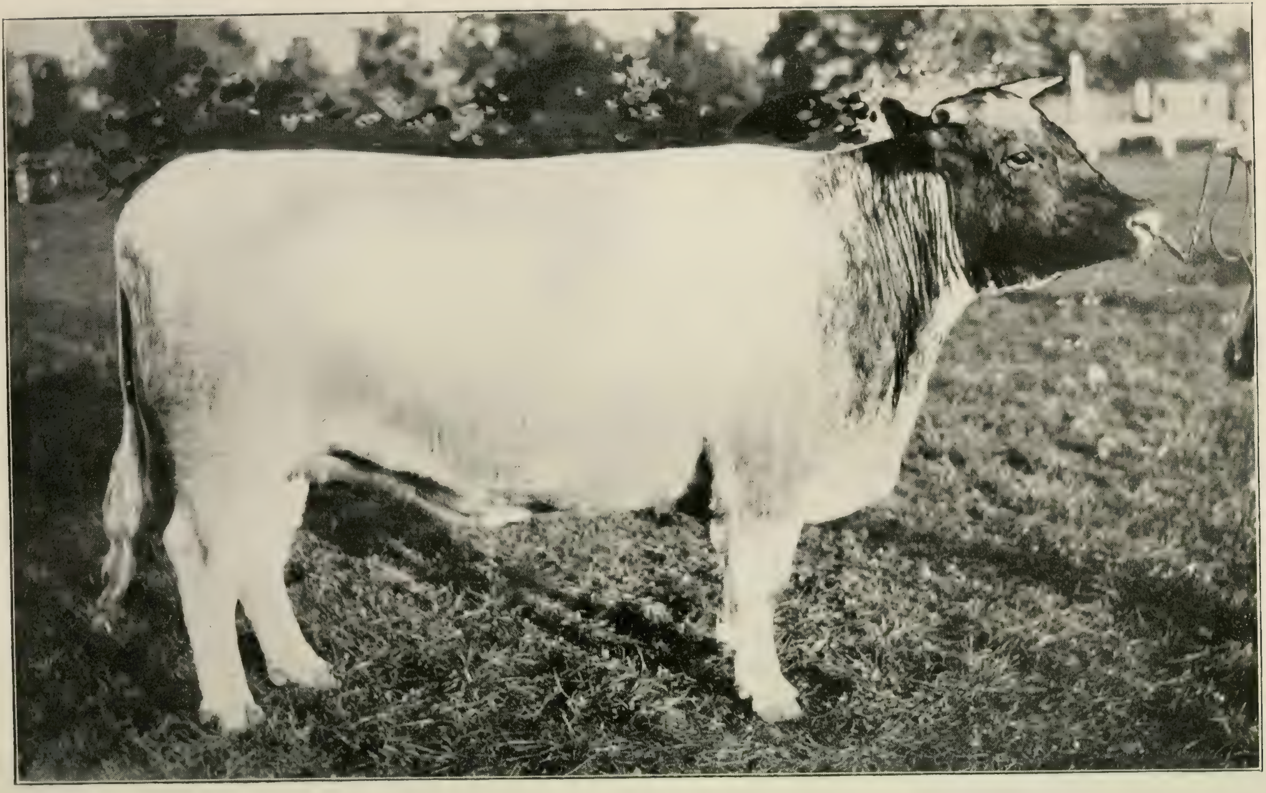
TABLE SHOWING TOTAL NET BUTTER SHIPMENTS OF THE STATE FOR THE YEARS 1890 TO 1903, INCLUSIVE, FROM IOWA TO POINTS OUTSIDE THE STATE; ALSO INCREASE OR DECREASE AS COMPARED WITH THE YEAR PRECEDING.

Years Ending October 1.	Net pounds of butter shipped.	Increase over preceding year.	Decrease from preceding year.
1890	71,255,796		
1891	68,690,716		2,565,080
1892	60,112,931		8,577,785
1893	54,572,902		5,540,029
1894	54,509,417		63,485
1895	66,497,108	11,987,691	
1896	80,032,916	13,535,808	
1897	83,620,081	3,587,165	
1898	77,364,337		6,255,744
1899	76,620,326		744,011
1900	71,719,329		4,910,997
1901	74,863,995	3,144,666	
1902	72,714,584		2,149,411
1903	77,079,794	4,365,210	

Counties shipping more than 1,000,000 pounds, net, of butter in the year ending September 30, 1903:

1903.	Counties.	1902.
6,148,916	Woodbury	3,355,487
3,297,892	Jones	3,388,707
2,889,518	Clayton	2,503,524
2,708,386	Polk	1,741,626
2,492,453	Delaware	2,224,684
2,300,554	Dubuque	1,950,853
2,200,187	Chickasaw	2,281,208
2,095,508	Fayette	2,056,986
1,811,873	Winneshiek	1,267,195
1,767,294	Page	541,286
1,535,243	Butler	1,947,337
1,497,022	Kossuth	1,642,669
1,389,848	Hamilton	9,833
1,368,998	Hardin	1,541,837
1,325,483	Mitchell	1,582,612
1,322,958	Calhoun	1,190,589
1,297,379	Bremer	2,417,627
1,280,365	Palo Alto	1,401,448
1,277,314	Carroll	1,003,265
1,266,285	Linn	1,005,048
1,255,694	Black Hawk	1,552,136
1,251,842	Buchanan	2,680,811
1,251,387	Allamakee	1,096,047
1,182,974	Jackson	958,966
1,142,702	Howard	1,204,099
1,166,093	Story	1,138,580
1,009,302	Dickinson	538,935
49,533,470	Totals	44,223,395

These twenty-seven counties ship 64 per cent of the 77,079,794 net pounds of butter shipped from the State.



"VILLAGE BELL."

Champion Shorthorn cow, season of 1903, as shown at the Iowa State Fair. Owned by D. R. Hanna, Ravenna, Ind.

NET BUTTER SHIPMENTS BY COUNTIES AND RANK—AREA OF COUNTIES.

Showing pounds of butter shipped per square mile and rank of counties; also total net butter shipments for the State and net pounds per square mile, for the year ending September 30, 1903.

Counties.	Total net shipments of butter for the yea.	Rank by total lbs. shipped.	Area of square miles in counties.	Pounds per square mile.	Rank by lbs. per square mile.
THE STATE	77,079,794	.....	56,025	....	.....
Adair	498,046	53	576	864	50
Adams	144,180	74	432	336	72
Allamakee	1,251,387	23	658	1,901	24
Appanoose	95,228	83	516	184	83
Audubon	832,051	31	443	1,878	25
Benton	669,743	37	720	930	48
Black Hawk	1,255,694	21	576	2,180	22
Boone	57,578	87	576	99	89
Bremer	1,297,379	17	432	3,003	8
Buchanan	1,251,842	22	576	2,173	23
Buena Vista	919,459	30	576	1,596	31
Butler	1,535,243	11	576	2,665	11
Calhoun	1,322,958	16	576	2,296	18
Carroll	1,276,314	19	576	2,217	20
Cass	189,925	76	576	329	74
Cedar	351,546	60	576	610	60
Cerro Gordo	542,177	49	576	941	46
Cherokee	143,948	77	576	249	79
Chickasaw	2,200,187	7	504	4,365	4
Clarke	15,754	94	432	36	94
Clay	516,027	52	576	895	49
Clayton	2,889,518	3	728	3,969	5
Clinton	554,967	47	698	728	52
Crawford	805,370	32	720	1,118	39
Dallas	614,612	41	588	1,045	40
Davis	39,911	92	503	79	92
Decatur	105,537	80	534	197	82
Delaware	2,492,453	5	576	437	67.
Des Moines	253,402	68	413	613	59
Dickinson	1,009,302	27	405	2,492	13
Dubuque	2,300,554	6	601	3,827	6
Emmet	741,726	36	404	1,835	28
Fayette	2,095,508	8	720	2,910	9
Floyd	776,628	34	504	1,540	32
Franklin	313,252	63	576	543	64
Fremont	3,249	97	509	6	97
Greene	193,747	73	576	336	71
Grundy	581,106	42	504	1,172	37
Guthrie	991,215	28	593	1,671	30
Hamilton	1,389,848	13	583	2,412	14
Hancock	387,371	58	576	672	55
Hardin	1,368,998	14	576	2,376	16
Harrison	285,915	64	695	468	65
Henry	70,915	86	433	163	86
Howard	1,142,702	25	476	2,400	15

NET BUTTER SHIPMENTS BY COUNTIES AND RANK—CONTINUED.

Counties.	Total net shipments of butter for the year.	Rank by total lbs. shipped.	Area of square miles in counties.	Pounds per square mile.	Rank by lbs. per square mile.
Humboldt	657,363	40	432	1,521	34
Ida	180,003	75	433	415	68
Iowa	582,446	44	584	997	44
Jackson	1,182,974	24	638	1,854	26
Jasper	249,782	69	730	342	70
Jefferson	93,031	84	432	215	81
Johnson	104,753	81	618	169	84
Jones	3,297,892	2	576	5,725	2
Keokuk	368,156	59	576	639	57
Kossuth	1,497,022	12	977	1,532	33
Lee	196,565	71	512	383	69
Linn	1,266,285	20	720	1,758	29
Louisa	43,217	91	407	106	88
Lucas	......	98	432	......	......
Lyon	196,874	70	587	335	73
Madison	21,595	93	576	37	93
Mahaska	581,752	45	576	1,009	43
Marion	56,742	88	576	98	90
Marshall	442,253	55	576	767	54
Mills	12,367	95	444	27	95
Mitchell	1,325,483	15	473	2,802	10
Monona	51,067	89	556	93	91
Monroe	49,280	90	432	114	87
Montgomery	125,712	78	432	291	76
Muscatine	103,419	82	437	236	80
O'Brien	569,574	46	576	988	45
Osceola	256,341	68	400	640	56
Page	1,767,294	10	557	3,172	7
Palo Alto	1,280,365	18	576	2,222	9
Plymouth	390,583	57	860	454	66
Pocahontas	541,798	50	576	940	47
Polk	2,708,386	4	585	4,629	3
Pottawattamie	272,894	66	960	284	77
Poweshiek	342,567	61	582	588	63
Ringgold	10,337	96	542	19	96
Sac	587,812	43	576	1,020	42
Scott	274,538	65	455	603	61
Shelby	194,334	72	590	329	75
Sioux	793,753	33	769	1,032	41
Story	1,166,093	26	576	2,024	21
Tama	458,560	54	720	636	58
Taylor	435,200	56	548	794	51
Union	535,929	51	432	1,240	36
Van Buren	81,222	85	484	167	85
Wapello	115,169	79	432	266	78
Warren	......	99	569	......	99
Washington	338,625	62	566	598	62
Wayne	667,342	38	523	1,274	35
Webster	553,833	48	720	769	53
Winnebago	928,549	29	403	2,304	17
Winneshiek	1,811,873	9	694	2,610	12
Woodbury	6,148,916	1	873	7,043	1
Worth	743,270	35	402	1,848	27
Wright	664,621	39	576	1,153	38
THE STATE	77,079,794	......	56,025	......	......

TABLE SHOWING NUMBER OF COWS FOR EACH COUNTY AND FOR THE STATE FOR THE YEARS 1895, 1900, 1901, 1902, 1903, AND VALUES FOR 1903.

Figures are from census 1895 and the reports of county auditors to the State Auditor for the years 1900, 1901, 1902 and 1903.

County.	Value.	Number.				
	1903.	1903.	1902.	1901.	1900.	1895.
THE STATE	$ 32,181,178	1,370,082	1,423,348	1,382,242	1,295,960	1,087,250
Adair	366,992	17,013	17,724	16,192	14,050	9,685
Adams	278,773	11,926	12,524	11,857	10,762	7,699
Allamakee	314,597	13,639	13,395	13,550	12,677	12,289
Appanoose	360,540	11,598	12,012	11,910	10,928	8,142
Audubon	268,902	13,282	13,673	12,920	11,581	8,276
Benton	422,616	17,959	18,668	18,653	17,407	14,503
Black Hawk	433,969	17,968	19,072	18,647	17,807	17,865
Boone	293,922	14,289	15,169	14,543	13,631	11,121
Bremer	454,042	17,605	17,492	17,989	17,671	18,001
Buchanan	385,984	16,566	17,816	17,605	17,254	18,790
Buena Vista	332,030	15,628	15,914	15,046	14,094	9,924
Butler	370,188	15,564	15,497	16,157	15,954	15,434
Calhoun	275,046	13,758	14,215	13,544	12,389	9,929
Carroll	327,915	15,558	15,825	16,172	14,467	10,823
Cass	345,430	14,290	14,446	13,372	12,299	9,813
Cedar	428,088	16,615	17,929	17,807	16,475	12,710
Cerro Gordo	255,980	12,718	12,252	12,609	11,795	10,089
Cherokee	304,508	12,466	13,377	13,999	11,743	8,882
Chickasaw	357,487	14,890	15,773	15,582	15,807	16,058
Clarke	240,251	10,168	10,701	10,298	9,397	6,887
Clay	236,293	12,110	12,464	12,782	11,689	8,394
Clayton	530,564	21,724	21,714	21,698	20,850	21,732
Clinton	470,376	19,541	19,706	19,583	19,167	21,272
Crawford	358,255	17,344	16,917	16,197	14,997	11,401
Dallas	328,761	15,152	15,346	14,169	13,703	10,512
Davis	249,080	10,020	10,260	10,252	9,877	7,242
Decatur	322,700	13,210	14,015	17,331	12,040	8,196
Delaware	444,448	21,334	20,836	21,163	20,301	20,777
Des Moines	228,694	8,779	8,624	8,501	7,793	7,525
Dickinson	157,261	6,502	7,010	6,842	6,188	4,018
Dubuque	438,738	18,769	18,054	19,095	17,844	19,372
Emmet	150,664	7,598	7,030	6,712	5,894	3,834
Fayette	524,208	21,768	23,018	22,575	22,282	23,734
Floyd	283,934	12,003	12,462	12,604	12,920	12,564
Franklin	282,217	13,680	13,801	13,056	12,117	11,320
Fremont	204,049	8,744	8,602	8,214	7,497	5,348
Greene	287,412	14,050	19,902	18,873	12,955	10,399
Grundy	344,134	14,559	15,177	15,214	14,778	13,606
Guthrie	360,369	16,197	17,554	15,961	14,525	8,834
Hamilton	371,723	15,267	16,099	15,535	14,441	12,769
Hancock	231,356	11,580	11,573	11,160	10,008	7,475
Hardin	376,047	15,519	17,113	15,825	14,669	11,959
Harrison	292,124	4,325	14,986	14,214	12,661	9,286
Henry	203,060	8,264	8,789	8,909	8,621	7,074
Howard	291,157	12,638	13,051	13,031	11,695	11,010

NUMBER OF COWS, ETC.—CONTINUED.

Counties.	Value.	Number.				
	1903.	1903.	1902.	1901.	1900	1895.
Humboldt	220,321	10,695	11,081	11,206	10,358	8,546
Ida	213,698	8,949	9,472	9,308	8,165	5,950
Iowa	404,040	16,936	17,175	17,382	15,457	12,270
Jackson	409,132	16,684	16,750	16,270	15,537	16,149
Jasper	478,442	18,689	18,862	17,974	16,201	13,870
Jefferson	248,120	9,110	9,665	9,306	8,228	7,465
Johnson	452,314	7,893	17,549	17,897	17,430	12,656
Jones	490,022	17,757	18,175	19,045	18,454	18,347
Keokuk	340,152	14,279	14,922	14,203	13,340	10,126
Kossuth	439,488	21,239	22,912	21,467	19,846	14,120
Lee	289,071	11,118	10,868	10,626	10,570	8,914
Linn	497,067	21,212	22,071	20,653	20,646	24,363
Louisa	187,976	7,345	7,675	7,256	6,701	5,503
Lucas	243,948	10,138	10,227	9,387	9,238	7,217
Lyon	236,298	10,724	10,350	9,231	8,239	5,301
Madison	289,892	13,763	15,388	14,095	13,300	9,426
Mahaska	329,600	13,676	13,919	13,725	12,840	10,328
Marion	311,124	13,063	13,226	12,667	11,226	9,624
Marshall	343,848	15,891	16,496	15,557	14.167	12,331
Mills	234,952	9,255	9,803	9,039	8,588	5,522
Mitchell	279,904	11,684	12,003	11,744	11,198	10,965
Monona	234,980	11,651	12,525	11,578	11,757	6,739
Monroe	23[illegible],452	9,027	8,981	9,152	8,222	6,533
Montgomery	225,504	10,984	10,853	10,402	9,907	6,970
Muscatine	287,962	10,228	9,193	11,040	10,104	9,233
O'Brien	262,835	17,728	12,895	12,356	11,023	10,179
Osceola	155,043	7,142	7,118	6,435	5,381	3,858
Page	344,753	13,661	14,067	11,875	12,756	8,084
Palo Alto	264,990	13,778	14,764	14,869	14,305	10,269
Plymouth	365,964	17,868	16,848	16,299	14,593	10,811
Pocahontas	254,784	13,493	14,083	14,191	12,790	9,354
Polk	392,116	15,682	15,492	14,815	13,616	11,578
Pottawattamie	614,124	21,933	22,356	21,378	18,336	14,437
Poweshiek	356,690	15,978	16,220	15,327	14,786	12,190
Ringgold	298,833	12,525	13,332	12,723	12,311	8,514
Sac	368,502	15,615	16,546	15,472	14,658	11,344
Scott	393,207	14,717	14,899	14,995	14,204	12,779
Shelby	395,840	16,674	17,960	17,117	15,195	9,522
Sioux	360,214	16,839	16,137	14,838	13,409	9,016
Story	346,733	15,082	16,017	15,112	14,394	12,216
Tama	433,461	16,461	18,098	17,974	17,028	13,653
Taylor	286,570	13,577	12,321	13,453	11,833	8,894
Union	269,832	12,024	12,735	11,590	11,344	7,510
Van Buren	248,248	9,154	9,247	9,099	8,678	7,132
Wapello	236,892	9,672	9,877	9,608	8,925	7,665
Warren	347,320	14,888	15,106	14,084	13,022	9,417
Washington	304,666	12,381	11,267	12,972	12,620	9,036
Wayne	322,276	13,418	14,064	14,459	13,178	8,543
Webster	405,080	16,186	16,135	15,438	14,928	13,462
Winnebago	187,448	11,519	11,769	10,450	9.368	7,100
Winneshiek	448,656	18,613	18,834	19,038	17,809	18,410
Woodbury	308,184	15.078	16,139	16,106	13,885	10,265
Worth	242,301	11,385	11,980	11,630	11,386	9,753
Wright	261,477	12,836	13,796	13,749	12,191	10,103
THE STATE.	$ 32,181,179	1,370,082	1,423,348	1,382,242	1,295,960	1,087,259

Average value of cows, $23.48.

Lowest reported value, Winnebago county, $16.27.

Highest reported value, Appanoose county, $31 08.

The very low average value is accounted for by the fact that the assessors include as "cows" all the animals not included in the classification "heifers one year old," and "heifers two years old."

Heifers two years old, 332,476; average value, $18.36; total, $6,103,178.

Heifers one year old, 516,071; average value, $13.51; total, $6,974,484.

HAND SEPARATORS IN IOWA.

The first statistics of hand separators secured for use in the dairy commissioner's reports were obtained in the year 1898. It is evident that any reports made will fall below the actual facts. A number of creameries neglect to report in regard to the number of separators in use and there is no way of determining how many they have. This is true for each of the years, so that for purposes of comparison the figures given below are sufficiently correct and, indeed, it is believed that they do not in any instance fall much below the actual facts.

NUMBER OF HAND SEPARATORS REPORTED.

1898	1899	1900	1901	1902	1903
904	1,762	3,332	5,231	8,323	16,041

The introduction of the hand separator into Iowa creamery methods has caused something like a revolution in the last six years. The total number of creamery patrons is now estimated to be about seventy-five thousand, of which more than sixteen thousand are using hand separators. This is more than twenty per cent of the total creamery patronage of the State. It is also estimated that fourteen million five hundred thousand pounds of butter are made from hand separator cream. There are in the State thirty-eight creameries that are practically receiving nothing but hand separator cream. Two thirds of the creameries of the State receive cream from one or more hand separators. There are forty-five plants which report that they receive cream shipped to them by rail and of these forty-five plants eleven are receiving nearly all their cream by rail and are properly called centralizing plants. In this connection. attention is called to the fact that sixty-one skim stations have been closed in the State during the last year, and the tendency seems to be to substitute for the skimming station the hand separator and the shipping of cream. The skimming station has been found to be a very expensive addition to the local creamery and for this reason it seems certain that the skimming stations will soon disappear.

CHEESE FACTORIES IN IOWA.

The report for last year showed fifty-two cheese factories in operation in Iowa, and the list found in this report shows but forty-three cheese factories. Nine of the cheese factories have gone out of business and two new ones have been established.

Of the cheese factories now in operation in the State, thirty-one factories report 20,621,763 pounds of milk, from which was made 2,039,921 pounds of cheese, and the patrons of these factories received $174,864, which is almost exactly 85 cents per hundred pounds for the milk. The largest factory in the State receives almost three million pounds of milk and pays for it an average of 90 cents per hundred. The most successful factory in the State receives two million pounds of milk and pays for it an average price of $1.08. The difference between these factories is that the larger one is not in a dairy district and the other one is, hence, the cost of getting the milk to the factory is less in the one case than in the other. The prices paid by other cheese factories range down as low as 68 cents per hundred pounds.

The average production of these thirty-one cheese factories which have reported appears, therefore, to be about sixty-five thousand eight hundred pounds of cheese per annum, and on this basis the forty-three cheese factories now in operation in the State would make approximately three million pounds of cheese, worth perhaps three hundred thousand dollars. From the foregoing figures, it will be seen at once that the cheese business in Iowa is not a very great amount, and probably so long as conditions remain the same as they are now, the cheese business will continue to be of little importance in the State. The relative prices paid per hundred pounds of milk by cheese factories and creameries may be a matter of some interest to those who are unable to account for the small number of cheese factories in the State. A certain Delaware county creamery, making 165,000 pounds of butter last year, paid its patrons $1.01 per hundred pounds of milk. It is evident that a cheese factory which could only pay an average price of 85 cents per hundred pounds of milk could not exist in that community and successfully compete with the creamery. The creameries of Bremer county last year paid an average price of 82 cents per hundred pounds of milk. No cheese factory could compete with these creameries unless it were able to pay a considerable amount per hundred more than the creameries are paying. It is evident that the expense of getting the milk to the creamery will not be more than that of transporting the milk to a cheese factory, and that the skimmed milk will be of much greater value than the whey which the farmer gets back. It is true, however, that other creameries that are not so successfully operated as the one with which the above comparisons are made have not been able to pay as much as the creameries mentioned above, and in these localities a cheese factory could easily compete with the creameries.

The cheese business does not seem to be adapted to all localities where milk can be easily and cheaply produced. Every northern state, with the exception of those in the semi-arid district of the Middle West, is a large producer of butter, but the same is not at all true in regard to cheese production. Nearly all the cheese is made in the states of New York and Wisconsin, and Iowa with its small number of cheese factories is given sixth place in cheese production by the national census of 1900. There are communities in Iowa where large and successful cheese factories are in operation, so that it is conclusively proven by them that cheese can be profitably made in Iowa but it is doubtless true that so long as the profits in butter making are equal to those of cheese making, the number of cheese factories in this State will be relatively small, for the reason that the making of butter and the utilization of the skimmed milk is more to the taste of the stock raising farmer than the making of cheese and the use of whey.

Corn Belt Meat Producers Association of Iowa in session at Des Moines, Iowa, March 1 and 2, 1904.

PART V.

TWENTY-SEVENTH ANNUAL REPORT OF THE IOWA STATE DAIRY CONVENTION.

HELD AT WATERLOO, WEDNESDAY, THURSDAY, AND FRIDAY, NOVEMBER 18, 19, AND 20, 1903.

PROCEEDINGS OF THE STATE DAIRY ASSOCIATION AND NATIONAL DAIRY UNION.

Officers for 1904.

S. B. **Shilling**, President	Mason City
W. B. **Barney**, Vice President	Hampton
P. H. **Kieffer**, Secretary	Manchester
F. A. **Leighton**, Treasurer	New Hampton

The Iowa State Dairy Association met in annual convention at Brown's Opera House, Waterloo, Iowa, November 18, 1903, at 8 o'clock P.M.

President Samuel B. Shilling in the chair.

President: We are a little late in starting owing to the absence of some of the speakers, but we will commence the program with the hope that they will be here soon.

ADDRESS OF WELCOME.

Mr. J. C. Murtaugh, of Waterloo.

Mr. President, Members of the Iowa State Dairy Association and Visiting Friends: It is indeed with genuine pleasure that I stand before you tonight and welcome you to our city, welcome you to Waterloo, which is known all over the length and breadth of this land as the city of progress; welcome you to Waterloo, the public spirit of whose citizens is known throughout the whole country; welcome you to Waterloo, a typical city of the twentieth century; and one which has elicited the most favorable commendation of any in the whole United States, the people of whose community are also mindful of the great advantages to be derived from a convention of this character. We also know the good influence that is brought to bear by the Iowa State Dairy Association. and we believe that your deliberations here will have a tendency to advance the industrial interests of Waterloo and of the State.

We also recognize the fact that in all these United States there is no place in the Union that produces better dairy products than the grand old Hawkeye State. I want to say to you tonight that your welcome is sincere and that it is cordial. We give you the freedom of the city and ask you to partake of the best that we have.

I now extend to you the welcome of Waterloo on behalf of our mayor and on behalf of our citizens, and in the name of Waterloo, the most thriving and the most beautiful little city in the most magnificent State in the Union. Thank you.

RESPONSE TO ADDRESS OF WELCOME.

Hon. H. J. Neitert.

Mr. President. Ladies and Gentlemen: It is with some reluctance that I appear before you again this evening. I fear that I am becoming something of a "chestnut" in connection with the Iowa State Dairy Association, but I presume there was no one else they could tickle with the privilege of appearing before this august assembly excepting this weak mind, and that is my excuse for appearing before you.

We have certainly received a most cordial welcome from the citizens of Waterloo. We appreciate this welcome from a city—as has been truly said—that is known from all parts and all points of the compass of this land, and yea even further, for I have learned in my sojourn in the city this afternoon, in visiting a manufacturing plant, that they are sending their manufactured product not only into all the markets of the United States of any importance, but also to Glasgow in Scotland, London in England, the Hawaii Islands, the Philippine Islands and other points in Europe which I can not now recall. This certainly speaks wonders for this magnificent little city upon the banks of the Cedar. Think of it, from the State of Iowa—the State of our adoption—and the one that has never to beg the question wherever known upon the face of the globe; there is less than 3 per cent of illiteracy in the State; that it has voters for every 3½ per cent of its population and casts a vote which I am proud to announce, because that is the right of every citizen—not only his right but his duty—to exercise the right of franchise, which is given him. I mention this simply to show you the intelligence of our people.

I can speak for Waterloo from my own knowledge, from what I have read in the different papers, journals and magazines, what I have heard from the traveling men (who always know all about the commercial enterprises of every city) from all parts of the compass, from the great markets, from all the people we meet—that Waterloo is held up as an example for others to follow. Its wonderful manufacturing industries and its great commercial interests; its stores are palaces, but the enterprise and push of its people certainly is to be admired.

These things have not come about by chance and certainly their citizens, in whatever calling or profession they may be, are entitled to a great deal of credit, because it has taken self-denial and hard work and "never-say-fail" determination to win this grand position among the cities of the United States and that of Iowa.

I appear not here particularly to eulogize the city of Waterloo. I am only stating what is true and not flattery. There is a saying that if the opportunity is taken advantage of at its tide you will succeed. They, through their business men and good counselors, saw their opportunity when their tide moved and they improved it. Others must not be jealous, because these opportunities come to every man in every community in a lifetime, and if taken advantage of they, too, must succeed. No doubt many others must be behind this city, although I must say that the State of Iowa is proud, and I can say that all up and down this beautiful Cedar Valley, and the valleys of the Wapsie, the Des Moines, the Turkey, for that matter, and also inland, the State is dotted with active and lively towns and cities of different sizes. This comes about by the intelligence of their people, which is shown by a statement I made a few moments ago, that there is only 3 per cent of illiteracy in the State.

But we are an agricultural State. I think the president once said if we ever amounted to much it would be through agriculture. We do not deny the charge. The nearest you come to living to that which is nearest to every honest mind and heart and conscience is the honor of yourself and the respect of your neighbor and the honor and confidence that he confers upon you. There is nowhere in the wide world that you meet this cordiality and this honest purpose and intention of mind and soul as you do in the rural communities. We are not criminals; we do not need to have police stations in the cities of our State, nor at the polling places to know whether a man has the right to exercise his right of franchise unmolested—whether he is a hero or not—but he knows that he has that right and he respects his neighbor's right and his neighbor respects his right, and we live nearer together, we enjoy more the benefits and all the pleasures of this life—a greater percentage of us—than in any large and congested community. I only mention this because to the agriculturist belongs the honest hard-working industry, the right thought and the honest purpose of mind and heart. There is no flattery in that. These are all truths that can be verified by practical illustration every day in the walks of life, and I am sure every citizen will corroborate what I say in that respect.

Now, then, we have assembled here as the members of the State Dairy Association to consider questions which interest the agriculturists of the State. You may ask what is the use of us meeting here year after year in first one city and then another. Why is it necessary, I ask, to have any organizations anywhere, of any enterprise in any community? We all know the reason why. We advance our ideas, exchange arguments and opinions, then draw our own coclusions and get the best results; beides, mankind likes to meet others of his race. He likes to meet other people from the different parts of the State, to visit and converse with them. It broadens his mind, it enlarges him, makes him a better man, a broader thinker. He does not stay in one rut all the time. He loves to affiliate with his neighbors. Here we meet to discuss subjects of interest to the dairy industry of the State of Iowa. Many men kindly give their time and their work to advance this enterprise, or this branch of the dairy industry. They do it often with expense and a great deal of sacrifice on their part, and it is true that very often the same men have to be called on year after year. It is well it is so, because they are well equipped to discuss the various subjects which may come up, and it is not always an easy matter to get people to fill these different positions, read papers or make addresses on the various subjects that may come before them or may require discussion. Consequently, it is often necessary for the same persons year after year to deliver these addresses or read papers upon the subjects and questions which may arise and that may need discussion.

The dairy industry of the State of Iowa is no small matter. We have, I presume, one hundred and fifty to two hundred thousand farmers engaged in the dairy business in the State of Iowa; at least there are fourteen hundred thousand cows to represent the dairy industry in the State. I will not tire you by quoting statistics. I merely want to call your attention to this matter and show that it is of no small importance, and that it is an industry that should not be neglected, and it is right that the people should discuss all matters connected with it at these meetings fully and openly in order to arrive at the best conclusions.

It brings in revenue to the State. It has been estimated, from the milk, butter and cheese alone, of twenty-eight to thirty million dollars a year. But this is not all; it is so interwoven with the other branches of the agricultural industry of the farm that it is almost impossible to compute the real-value of the cow to the farm. It gives employment to a greater number of the members of the family and the help that it may have, and the family, as they grow up, will follow the industry. They can in the dairy be a support and a help to the farmer, which in other branches of agriculture would be impossible, they could not be as self-supporting; and besides it lifts the mortgages off the farms. It has done it in years gone by; it increases the bank accounts and I venture the assertion that you take any section of our State or neighboring State situated in like manner, where the cow has not prevailed and the dairy industry has not been pushed as it should, that there you will find the largest per cent of mortgages and the largest bank accounts on the wrong side of the ledger written in red ink, and the largest amount of notes given by the farmers for loans extended. Now, you may think this is old, but a good story or a truth, as I should say this is, never gets too old to tell.

I feel it incumbent upon me to advance these ideas when I am called upon to say anything to an audience as intelligent as this. I can not help but state these facts which you must not lose sight of. And that is not all the industry gives them—it furnishes that which replenishes and builds the fertile soil of the State of Iowa. It has rebuilt many farms that without the dairy would be a waste.

Now, I do not know but I have taken up more time than I should, Mr. President. I am sorry to have detained you so long, but what I want to impress upon your minds is this—that for the dairy industry of the State, for the protection of the dairy and its products, I want to make an appeal to all those who supply the milk or cream. Do not adopt a losing policy; do not go backward. There is some danger of that. Momentarily you may think there is a gain, but I want to assert right here (and this subject will be discussed hereafter) that unless you look carefully after these things—unless you look well to your calling and follow the old adage, "that which is worth doing at all is worth doing well," and adopt it—you will be the loser. Do not be deluded by some tale of sophistry that some advance agent may be whispering into your ear while he has you, for a moment, hypnotized.

There is nothing accomplished without earnest effort and hard work, without honesty of soul, and I can not think of anyone so destitute as the man, providing he have health and vigor, who will sit down and wait or have nothing to do. It matters not what calling you are in. I know farm work is laborious; I know it is not as hard as it used to be. I was raised on a farm myself and speak from experience. I know that those that stick to it make a success of it.

I am not going to lecture all the time, but these things must be brought out. I know that the man in business or the man with any calling or profession, if he has not many a time burned the midnight oil, that man is a failure. I know, further, that the only royal road to sucess is by diligent and continuous hard work. I do not know of anyone who can rest as well, who can eat as well and digest his food as well, meet his neighbor with a clearer conscience or feel better toward himself (and he ought to feel right toward that person if to anyone in the world) than the man who is continually employed.

On behalf of the Iowa State Dairy Association I return many thanks for the cordial and generous welcome of the citizens of Waterloo, extended through their honored gentleman, Mr. Murtaugh. I trust that your meeting may be both pleasant and profitable. I thank you for your kind attention and hope you will overlook my rather lengthy remarks.

THE PRESIDENT: I want to make an announcement before we go any further and that is the two highest scores will be read at the close of the meeting this evening.

SECRETARY'S REPORT.

PREMIUM FUND.

Receipts—		
Balance on hand, last report	$ 21.65	
Contributions to fund	355.00	
City of Cedar Rapids	200.00	
Received from treasurer	200.00	$776.65
Disbursements—		
Paid butter-makers on pro rata	$633.00	
J. C. Daly, expense bill	31.68	
J. W. Leasure, labor	23.00	
L. H. Henry, printing	1.50	
S. G. Sloane, printing	17.25	
C. A. Calder, cartage	3.50	
J. C. Daly, expense bill	36.07	
Jurgens & Anderson, medals	55.00	
Western Union Telegraph Co., telegrams	.78	
Charles City postoffice, stamped envelopes	23.20	
Hanright & Son, carriage for Governor	3.00	
Martin Dry Goods Co., pins	1.75	
P. Newcomb, ribbons for badges	43.73	
I. N. Kramer & Son, carnations for Boardmen	4.58	876.04
Balance, overdrawn		$ 99.39

We, the undersigned auditing committee, have examined and checked the above report, with vouchers and bills in the hands of the secretary, and find the same correct as reported.

A. E. ANDERSON,
S. B. REED,
E. PUFAHL,
Committee.

NATIONAL CONVENTION FUND.

Receipts—		
Balance on hand at last report	$ 11.01	
Prize won at Milwaukee	25.00	$ 36.01
Disbursements—		
Printing badges	$ 10.00	
Express on banner to Milwaukee	2.50	$ 12.50
Balance on hand		$ 23.51

We, the undersigned auditing committee, have examined and checked the above report with vouchers and bills in the hands of the secretary, and find the same correct.

A. E. ANDERSON,
E. PUFAHL,
Committee.

I want to say one thing in the way of explaining what is termed the National fund. It is a fund that belongs to the butter-makers and is a fund established a few years ago at the convention in Lincoln and has been kept a separate fund by itself and properly belongs to the butter-makers, so that is the reason it appears in a separate report.

TREASURER'S REPORT.

GENERAL FUND.

Receipts—

By membership fees	$ 167.00	
By J. B. Ford Co., contributions	10.00	
By Cude Bros., sales butter	485.68	
By M. W. Ashby, treasurer	355.72	
Total		$1,018.40

Disbursement—

U. S. Express Co	$ 23.08	
American Express Co	19.90	
Carpenter work	33.15	
C. P. Shipler, membership cards	1.75	
Republican Printing Co., score cards	9.70	
Mary Chappel, stenography	10.00	
Joe Trigg, expenses	10.00	
Joint Agent	37.75	
Prof. E. H. Farrington, expenses	49.67	
J. A. Muncey, expenses	5.42	
Prof. G. L. McKay, scoring butter	40.00	
B. F. Wright, printing	19.50	
Four drafts	.35	
H. R. Carpenter, expenses	7.20	
John Daley, premium money	200.00	
John Daley, salary	150.00	
Three drafts	.25	
Mary Chappel, stenography	23.50	
Anna Wixted, stenography	15.00	
P. H. Kieffer, butter-makers' prize money	25.00	
Three drafts	.30	$ 681.52

Total receipts	$1,018.40
Total disbursements	681.52
Balance on hand	$ 336.88

We, the undersigned members of the auditing committee, have examined the report of F. A. Leighton, treasurer, and find that his report is correct as per bills and vouchers attached.

Waterloo, Iowa, Nov. 17, 1903.

A. E. Anderson,
S. B. Reed,
Committee.

THE PRESIDENT: I am going to crave the indulgence of the audience in the appointment of the committees. It is not necessary to appoint any committee at this time excepting the committee on resolutions; I will appoint that committee this evening and the other committees probably tomorrow afternoon. I would appoint on the committee of resolutions: H. J. Neitert, Walker; H. R. Wright, Des Moines; W. A. Smarzo, Masonville.

PRESIDENT'S ADDRESS.

Mr. Chairman, Ladies and Gentlemen: It is not my intention to detain you very long this evening with an address. The fact of the matter is I have prepared so many addresses for this occasion and have changed them so many times in order to suit the occasion. I really feel that I stand before you without any address at all, but I want to refer you first to the report of the treasurer that has just been read.

To me it is very gratifying, and I know it must be to you, that the Iowa State Dairy Association is in such a splendid financial condition. It has only been a few years—and a very few years indeed—that this association has been either in debt or with a depleted treasury. We had no money from one end of the year to the other. This last year we carried over a surplus of $335 in the treasury, and the indications now are that we will have a larger surplus next year than we have had in the year just past.

It has been our aim and hope to hold, if possible, the amount of money the butter sold for in the treasury; that is a fund that properly belongs to the butter-makers. We really have no right to touch it, but the butter-makers of Iowa, with their usual generosity, have never raised a question when we were obliged to use their money (which we have had to do almost every year), and we have always been able to replace it and add a goodly sum to it by the time of the next convention. But, as I said before, it is our intention and aim, and I believe it will be possible from now on, to hold this amount of money from one year to another as we should.

I want to talk to you just a few minutes about the progress that has been made during the past year in both dairying and butter-making in our State. It is gratifying to be able to look back and know, as I do, that there has been some progress made during the past year along the line of butter-making. The farmers of the country are fast realizing this one thing, that as sure as they engage in dairying they are sure of a profit.

We are suffering in this State—the same as they are in others—from the fact that there is too low a production from the individual cow, or, in other words, we do not appreciate today the possibility of the individual cow, and I do not believe I make a misstatement when I say to you that we should just double the amount of money we are receiving today from the products of the dairy, without the addition of a single cow. This may seem to you a broad statement, but the fact of the matter is we are no different in our conditions in the State of Iowa than in other states. Agricultural and dairy schools have demonstrated the fact to us that the dairymen of the country are only receiving one half of what they should from the individual cow, and it seems to me, while it is necessary for us to do a certain amount of work in spreading the doctrine of good dairying throughout the country, the principal part of the work, the principal effort that should be made by this association, that should be made by everyone interested in dairying in Iowa during the year to come, should be made along the line of increasing, as far as possible, the production of the individual cow.

We are laboring under the same conditions we have always had to contend with, the difficulty of reaching the man that milks the cow. This is one of the greatest obstacles we have to contend with, for the great mass of the farmers do not attend the Iowa State Dairy Association meetings, they do not come to our butter-makers' meetings, they are not students of agricultural papers. The fact is it has been discouraging to try to reach that class, and we have given the matter a great deal of thought.

I want to say a word here which I properly should say to the butter-makers when I talk to them a little later, for I believe it is within the province of the butter-makers and it should be a part of their education today, to take up the question of educating their patrons, and I believe they should become to a certain extent instructors. I know the only thing for the butter-makers to do is to start this educational campaign; it is within their province to do it, and although the impression and gains they may make will be slow, I can see no other way to get at them unless they do this.

One year ago I stood before your convention and advocated the creamery picnic. While I advocated it a year ago, in the light of one year's experience I stand before you today and urge it. The experience we have had along the line of creamery picnics shows there has been more benefit reaped from them than anything we have been able to do. The reason is because there is always something associated with the word picnic of having a good time.—there is always a horse race, a ball game or something to attract people—and it gives the speakers a chance to get before them when they come for the other attraction, gives us a chance to talk to them and interest them. We have made great progress in this direction and I want to refer you to a little place in northern Iowa, at Manley, where the creamery gave a picnic last season. The farmers were so elated with the success and the pleasure of the entertainmnt that, immediately after having held the first one, they began to plan for another for next year. Mr. Kieffer, our assistant state dairy commissioner, informs me that there is not a creamery today in Iowa that has made as good progress from beginning to the end as the Manley creamery. I want to urge the butter-makers to take this matter up next year, and if I could have my way I would have every creamery in the State of Iowa give a picnic.

Our association, as an association, has become so large and unwieldy that without the assistance of State aid, which we have tried so hard to get, we have been obliged every year to put our convention on the block and auction it off. We have had to sell it to the city that could give us the most money, the city that could accommodate the great crowds we have, regardless of the dairy interests of the State, and as these cities are large there is usually no dairying really very near them, and it makes it almost impossible for the farmers to attend our State association meetings. We have been confronted with the fact for a long time that our grand Iowa State Dairy Association, so far as educating the farmers is concerned, amounts to almost nothing.

While I do not wish in any way to entail hardships upon my successor, I do want to recommend this: it is within the province of the Iowa Dairy Association, in addition to holding this one grand, great meeting—the grandest and greatest meeting of all State dairy associations—to hold in addition to this two or three ordinary meetings. I am going to recommend that these meetings be held; I am going so far as to recommend more work and probably more hardships for the Iowa State Dairy Association than probably has ever been attached to it. I believe we can go to some community, to some smaller place, and hold auxiliary meetings, that we can manage them upon the same basis that we are today managing the Iowa Dairy Association; we can secure members and we can secure subscriptions from them, which will allow us to pay for outside speakers. The officers of the association can donate their time and I believe that is what we must come to before this association is going to amount to anything from the standpoint of the farmers of the State.

Now I want to talk to the butter-makers a little while. In the first place, I want to thank you. I wish every butter-maker who has a tub of butter over there in that hall were here tonight. I am proud to tell you that we have one of the finest displays, with one exception (in Dubuque), one of the best displays of butter that Iowa has ever had. You will feel just as good over this as I do. We have one hundred thirty-seven tubs on exhibition. In Dubuque we exceeded that number, but, as you know, we tried to take the place of the national convention at that time and threw the bars down and let everybody in. As I said before, I want to thank the butter-makers. This exhibit means this, it means they have an interest in dairying, in butter-making, in improving their methods, and again I want to thank you for the Iowa State Dairy Association and for the officers of this association. We worked hard to get you to come; you responded nobly. You showed your desire and your attention to improve your methods, and I want to take this occasion to thank you for it publicly.

It has been only a few years indeed since Iowa had not to exceed three butter-makers in the State upon whom we could depend every year to go to a national convention and come back with a creditable showing. While that is a hard confession to make, it is a fact. Three years ago we did not have over three butter-makers in the State that we could bet on every time; today we have a dozen of them that we know we can send to a national convention and they will come back with a creditable showing; we have dozens more on the way; we have the foundation laid for a hundred more and, if we can keep up the same work among the butter-makers that we have done in the last two years, Iowa will again take the position which she so proudly held at one time,—the best and greatest butter producing State in the Union.

These results have largely been brought about through the work of our agricultural college and through the untiring efforts of our State Dairy Commissioner and his assistants. I believe today, in fact I know, that we can take up the trail of the Iowa State Dairy Commissioner and his assistants and follow him from one end of the State to the other by the work he has done and the results produced. Not only that, I can say that we have in the State of Iowa today a set of traveling men, selling machinery, selling supplies, selling every commodity used in the creamery, who have been turning themselves into instructors. They have taken a pride in butter-making in Iowa, have preached the doctrine of good butter-making and have kept up the enthusiasm, and without them it would have been impossible to accomplish what we have.

I want to say in regard to the butter-makers' association,—we started these organizations two or three years ago and they have exceeded our expectations. Butter-makers took a greater interest than we expected; it aroused a spirit of competition in them which has resulted in great good, and I want to urge the butter-makers to continue these organizations. I do not want you under any circumstances to drop these meetings. Although we may not see the benefits directly, there has never been a meeting held but some good has been done. I want to urge you to keep these meetings up and I want to again refer to the aid of the picnic and urge you to incorporate that also in the year to come.

One year ago I appointed a committee on legislation with the end in view of getting State aid, if such a thing were possible. Unfortunately for us, there has been no session of the legislature since we appointed that committee, so that they have had no opportunity to act upon it. We are today laboring under disadvantages which no other State has to contend with, for they are well fortified and we have no assistance. I want to urge upon you that we are now ready to commence work (someone has suggested next Monday) of going before the legislature and getting an appropriation for this association. We have been in existence now for twenty-seven years without missing a single meeting, and if we get the small appropriation asked for we can carry on two or three meetings during the year and do some good for the dairy interests.

I will say that whenever we have tried to get State aid they have either entirely ignored us or have failed to realize the magnitude of the dairy interests—what it really means. They failed to realize that the dairymen of the country represent the most wealth of any one branch of agriculture. They failed to realize this when we went before them once before (as lobbyists who had never been there before and did not know how to go about it), and they turned us down. They did not realize at that time that they were turning down the greatest money interest in Iowa. We want to impress that upon them.

Another thing in regard to this which I want to bring to your attention, and this to me is a delicate subject -the State of Illinois has had $15,000 donated to make a showing at the St. Louis Exposition, Minnesota as had $20,000, Wisconsin $15,000, and Iowa, the greatest State of them all has $2,500. Is it any wonder we have an uphill fight on our hands? I do not feel like criticising our legislature, but these facts confront us today; we have no State assistance. Minnesota, occupying the place we should have, has nine creamery inspectors, and Iowa, with one third more creameries, has one. It was my pleasure last winter to talk to a few farm institute meetings, and I never failed to bring this matter up and show them the condition of the dairy interests of Iowa, and to impress upon them that when the next legislature was elected we would depend upon the farmers to say that we want money for the Iowa State Dairy Association, and I want to say in conclusion that in order to do this we must commence work at once. We must go into every congressional district in the State of Iowa; we simply have to go after every man who has a vote in the legislature, show him the condition we are in and ask for this appropriation, and I believe the sentiment is such that we will get it. I thank you.

THE PRESIDENT: It has been said, and well said, that an Iowa convention was not a convention without a certain man being there. Last year we had a convention and for the first time in my recollection that man failed to be with us and we missed him from the time the convention opened until it closed. That man is with us tonight and will favor us. I have the honor and pleasure of introducing to you Mr. Jules Lombard.

MR. LOMBARD: Before I sing anything, I would like to speak a few words. The dairy interests of the country produce more money by fifty millions than all the grain we raise. That is a fact by figures. Now, if you aid the dairy industry you are making prosperity the strongest card in your hand. Fight it out on this line. I am glad to be with you tonight once more and will sing anything you want. What shall it be, something new or something old?

Mr. Lombard then favored the audience with several selections in his usual able manner, and was heartily encored.

THE PRESIDENT: The next on the program is an address by Governor Cummins. I wish to say for the Governor that he went to the depot in Des Moines this morning, under the impression that he could come here and speak this afternoon, returning to his home this evening. We had no session this afternoon and in order to come and address you this evening, it would have been necessary for him to lose two days' time, which he did not feel he could afford to do just now. Fortunately he was met in Des Moines by Mr. Wentworth, who assured him that he would try and arrange for him to appear tomorrow afternoon, and we believe the arrangement will be entirely to our benefit, and if we had to make the program again we certainly would have had Governor Cummins in the afternoon. He will therefore address you tomorrow afternoon at 2 o'clock.

We have a man who is ready and willing to take the Governor's place on the program. That man we can always call on in times of emergency, and can put him backward or forward on the program. We have put him forward tonight and Hon. H. R. Wright will now address you in place of the Governor.

ADDRESS.

Hon. H. R. Wright, State Dairy Commissioner, Des Moines.

Mr. President, Ladies and Gentlemen: I am reminded by a few familiar faces that this is not my initial appearance on this platform. The other occasion, as I remember it, was somewhat embarrassing; it was a long time ago and almost everybody has forgotten it, but I remember it quite well. I think it was seventeen years ago I appeared here last, as a graduate of the West Side school, and I remember that literally my hair stood right up straight, partly because that was the fashion then, but largely for other reasons which will suggest themselves to you. And I remember another thing about that; that is the bouquets came at the other end of the speech; this time the bouquets seem to have come first.

You will be surprised to learn that the dairy business is a new thing. I suppose some of you (not these fellows in front, but some of you) are familiar enough with the Bible to know that butter-making and that sort of thing is spoken of in that good book; but what I mean is that dairying in any modern commercial sense is comparatively new. I think that has developed during the lifetime of most of us and has advanced very largely during the last thirty or forty years.

You remember some of the old poems in the school books, how the poet spoke about the pretty milkmaid and that sort of thing. Mighty little poetry about it nowadays; mighty little poetry about the horny-handed hired man milking the cows, about the steam engine and the separator or the power churn, the refrigerator cars and cold storage. Mighty little poetry about that now. The thing is different than when the poets got in their work for the benefit of the school boy. It's a new thing—the creamery—within the last twenty-five or thirty years, and all the things which I have suggested have come with it.

The dairy business is not only a new thing in that sense, but a big thing. You know there are a lot of industries that by their very nature require concentration of capital, the honest wielding of that capital by one or two men, and we take off our hats to that sort of thing, and we are impressed by the magnitude and the dignity of the size of the industry. But when we look at the old farmer, with his overalls and his rough books and his small investment in a few cows, we are a little inclined to think it does not amount to a great deal, it is not a very big thing; but I want to tell you that, as suggested by Mr. Lombard, that old farmer, with his small investment in a few cows, is a representative of the largest line of agriculture in the United States, or in the world, save one.

The total value of the dairy products is about six hundred million dollars per year; the total value of the hogs sold (you know we raise lots of hogs in this country) is only five hundred millions; the value of the hay and forage is less than five hundred million; the value of the cattle that are slaughtered, it must be enormous, everybody knows, but it is only four hundred million dollars. We are impressed oftentimes with the thought that if the wheat crop fails there would be a great financial disaster, yet the whole value of the wheat crop is only three hundred sixty million dollars, a million a day, and butter is worth almost twice that much.

And so with other agricultural products, there is none of them that approaches the value, the great value, of the dairy product, except corn which has a value of eight hundred million dollars. So the dairy business is a great thing, and the old farmer is the immediate representative of that business. It is a big thing and so we may congratulate ourselves that this association in some sense represents one of the greatest industries in Iowa.

It may be interesting to know something about how Iowa stands in the business, and I am proud to say that as far as butter-making is concerned Iowa is easily first. Of the four hundred twenty million pounds of creamery butter made in the United States, Iowa makes almost exactly twenty-five per cent. Now, think of it, with an area of only a little more than fifty thousand square miles we make one quarter of all the creamery butter in the United States. We make, perhaps, ten per cent of all the butter that is made, there being a large quantity of farm (not creamery) butter made in the country. The exact value, as I say, is about six hundred millions of dollars. Now, of this value, two hundred seventy million is the value in butter and twenty-six million is the value in cheese;

and about half of that, or eleven million, the value of condensed milk. The largest single item in the value of dairy products is the value of milk and cream consumed as such. If you stop to think, the large cities must require enormous quantities of milk and cream for the consumption of the population, so the largest single item is two hundred seventy-five millions, the value of milk and cream consumed as such.

Now, the whole products of the dairy Iowa ranks fourth; New York first, with a large city consuming enormous quantities, has fifty-five millions as the total value; Pennsylvania second, thirty-five millions, another large city there; Illinois, with Chicago in it, the third, twenty-nine millions; and Iowa fourth, with no large city, the aggregate value being twenty-seven millions. So you see that we rank well up to the top. Well, now, if that be the history of the past and the present, how about the future?

There are a whole lot of fellows, you know, that are pessimistic along about this time of year. The creameries are not making so much butter, some of them have to shut down for a while, and a whole lot of fellows think the whole business is going to the dogs. You do not need to worry. The farmer does the thing that he must. Do you believe that? I say, he does the thing that he must; he thinks he does it because he likes it, but it is not so. He raises corn in Iowa because he must, the soil and climate are conducive to that; he does that because he must, although he thinks he likes to do it. For the same reason he raises hogs and cattle, and for the reason of adaptability we produce butter here, and will continue to do so.

Think of the states now that produce the largest amount of dairy products. Beginning at the Atlantic ocean, straight across the continent to the other ocean, we would find dairying were it not for the arid region in between. Then south of Mason & Dixon's line, there is no particular interest in dairying there, and there never will be, for the reason that the business is not adapted to that sort of country.

If that be true, that the dairy business thrives where it fits the case, and it does fit the case in Iowa without a doubt, then it must be true that in the future we will continue to produce large quantities of butter in the State of Iowa. It must be true that other states will surpass us, but we do not care for that. We will have seats in the band-wagon just the same.

Now, the farmers of Iowa and of every other place know this thing to be true. They do not like to milk cows but know this is true, that the milking of cows and producing of butter and cheese (in a community where cheese is made) is the surest thing the farmer can do; it is a sure thing, you can not fail at it. And so, for that reason, when hard times come we milk lots of cows; and for a similar reason when times are easy and everybody is prosperous, we let up on it, and that is the situation in Iowa at the present time. There has been considerable decrease in the last four or five years and that is the reason. There are a lot of people scared and think we are all going out of business as creamery proprietors and butter-makers, but they are scared too soon. When conditions change then the increase which has characterized the past will again be found to be true.

The farmer knows that the dairy business is a sure thing; he knows it brings cash into a community at a time when the farmer has nothing else that will bring cash. He knows it is the best thing he can do when he must do something to get money, and for that reason, and for the reason of adaptability of the business to this section, it will continue for an indefinite time and continue to increase, so that the fifty-seventh annual convention of the Iowa Dairy Association, without a doubt, will be able to report a very important increase over the present.

If you will look at the map of Iowa, such a map as we prepare for our annual report, you will notice that nearly all the butter is made in this corner of the State, that the northwest quarter of the State makes nearly half the total amount of butter produced in the State; but when the rest of the State develops, as it will in the next ten or fifteen years, the amount of butter Iowa will produce may be even greater than now in proportion to the whole amount that is made.

THE PRESIDENT: We will not detain you much longer. We have just one more piece on the program. A little over a year ago, when Secretary of Agriculture Wilson was in the West, one of the leading dairymen in the country, in an interview with him, asked him why he did not come West to conventions any more, and he replied, "It is my intention to visit Iowa at the next dairy convention that you have, but in case it is impossible for me to be there I will send a representative." With this we placed his name on the program, and while he has found it impossible to be present himself, he has sent the Honorable Mr. Lang who will talk to you in place of Secretary Wilson.

REMARKS BY HON. MR. LANG.

Mr. Chairman, Ladies and Gentlemen: If there is any place in the world where a man should talk it ought to be in this town of Waterloo. The very name is an inspiration. I have come here, as your chairman has announced, as a representative of the agricultural department of Washington. That department, as you all know, is presided over by a man whom the nation honors and the State of Iowa justly loves.

I have said that I was here as a representative of the department, although that is hardly the fact. I have been operating and working in Iowa and contiguous states for nearly a year and a half. I have not been in Washington for about a year. As a matter of fact, I am only one third of the representation of the department here tonight. We have Professor Webster, who occupies a seat on the stand, and we have Mr. Collyer, the handsome man of the trio, who occupies a seat somewhere in the audience.

It is getting late and you are all anxious to hear the results of the butter scored today, so I will thank you to excuse me and, if possible, would like to hear from Professor Webster and Mr. Collyer. Thank you.

REMARKS BY PROFESSOR WEBSTER.

Mr. Chairman, Members of the Iowa Dairymen's Association and Friends: I must say I am very glad to be in Iowa again. Some of my happiest days have been spent in the borders of this State, although I am not a native of Iowa, but I have a very warm spot in my heart for the Iowa butter-makers and the Iowa dairy interests .

You have spoken a little this evening of the Iowa dairy products, and while some of you were lauding butter and cheese and various other things I thought of another product of Iowa in dairy lines which was not mentioned, but I want to mention it now. I have been traveling for the last three months over the western country and as I have gone into different states I have become acquainted there with the men who were leading in the dairy work, who had charge perhaps of dairy school work, and some of the butter-makers in the states in which I have visited. As I crossed the plains of Kansas I found a good many of the Iowa products in the way of Iowa men who learned dairying in this State and who are now on the plains of Kansas promulgating the truths of dairying there as they learned them here. In fact. Kansas has sent a good many men to Iowa to get educated along dairy lines. And as we pass to Colorado, where you think of nothing but gold and silver as you think of that State. I find there an Iowa boy, one who got his early education and whose early life was spent in this State, and there he was showing these people that there was something besides gold and silver in their hills. You can come back across Nebraska and you will find in this state. a great dairy state now, a young man who gained his early education in Minnesota, but we had to come to Iowa to finish up. And then you can go to the State south of us, where we have to show people. and you will find there one of the finest men that Iowa has ever turned out in dairy lines leading those people on to better things in dairying.

I want to say to you that the butter and cheese you are turning out on the prairies of Iowa are not the only dairy products of the State, but you are sending out these men all over the country who are raising the name of Iowa and placing you well to the front as a dairy State from every standpoint. and I want to say that the people are coming to Iowa to learn more about dairying.

When Mr. Shilling was making his remarks about the needs of Iowa along dairy lines, it impressed me as to what Iowa should do in an educational line, in putting men into the field to go to the creamery and train the butter-makers in the better development of their business. I hope Iowa will not continue to send all of these men away from the State. but you can. as has been suggested, bring your legislature to a point where they will keep these men at home and produce better results right here. rather than sending them abroad. So far this has been all good and well, but keep some at home and advance the dairy interests of this State, as they may be advanced. although it is now one of the leading dairy states of the Union.

I am glad Iowa is turning out this class of Iowa products. and it is through our dairy schools of various states of the Union. and though the men who are working in the field as instructors, and through men who are encouraging our butter-makers to better things, that the dairy interests of our State will be raised. I hope the people who will take hold of this matter, and that they will give our dairy school enlarged efficiency and better equipment. Iowa surely has the lead now and I hope she may keep it, because she is worthy of it.

LETTER FROM MR. BOARDMAN.

Lyons, Iowa, November 17, 1903.

To Members of the Iowa Dairy Association Assembled:

It was my hope to have attended the convention this year, but as much as I should have liked to have been with you, all things considered, it was thought best I should not, but while I am absent in person, my heart is with you, and my hope is that by another year to be able to attend your meetings. Allow me at this time to thank you for your kind remembrance of me last year. Let me assure you that it remains one of the brightest spots in my memory. My wish is that you have as good a convention as previous ones have been that have been held at Waterloo. Well do I remember those meetings. What a good time we all had. Many were there who will be in attendance at this meeting, but some will be missed, and their places will have to be filled by others. I look back and see the old boys, and sometimes wonder if ever I shall see them or hear their voices again. I take just as much interest in the old subjects as ever, and hope some day to take my old stand for them.

Wishing you a good and profitable time, I remain,

Very truly yours,

(Signed) W. K. Boardman.

Mr. Wentworth: I move that the letter be accepted and made a part of the regular minutes of this association, and that the secretary be instructed to telegraph our congratulations to Ex-President Boardman in the morning, expressing our appreciation of his interest in us. At the same time, I desire to say to the members that our former president is rapidly recovering his health, and he he is ery glad to have any of his old friends drop in to see him and to make new acquaintances at all times. From his letter you will note he is visiting at Lyons. He was able to go to South Dakota and spend his outing there last summer, and there seems to be no reason to believe that when we have another convention Mr. Boardman will be able to be with us.

He occupies a very unique position in the affections of every member of this organization. There are two names that will never be forgotten by the Iowa dairymen, one is John Stewart, gone to his reward long since, the pioneer creameryman of the State; the other is Honorable William K. Boardman, successively State dairy commissioner for two terms, president of this association and president of the National Association, the most indefatigable worker in the interest of dairying in Iowa that the State has ever had, and we do ourselves greater honor in honoring William K. Boardman than we could confer in any other way. I again move the adoption of the letter.

Motion duly seconded and carried.

THE PRESIDENT: Tomorrow morning at 9 o'clock Professor McKay will be at the butter-room and we are ready to commence instructions to classes of exhibitors. We are going to commence alphabetically and want every exhibitor whose name commences with A and some of those whose names commence with B to be there by 9 o'clock, when Professor McKay will commence the instructions.

Everyone who has railroad certificates will please hand them to Mr. Leighton. He has commenced to sign them and will return them to you. We must have one hundred before we can get reduced rates, so please attend to this as soon as possible after adjournment.

Tomorrow at 11 o'clock our constitution provides for election of officers. The butter-room will be closed. We want a full attendance at that time. It will only take a short time, and, as I said before, you are all interested in that and we want you here at the election. Now, about the scores, I want to ask this as a favor. It has always been our experience that as soon as buttermakers knew their scores they were inclined to go home. We have introduced something new in taking you in classes through the butter-room and we want to ask that unless absolutely necessary for you to go, you remain during the convention just the same as though we had not done this.

Another important matter. The association is supported largely through membership fees of $1, and we want everybody to come and take out a membership from the treasurer, Mr. Leighton.

Question: I have been asked to inquire if none but exhibitors are admitted to that instruction in the morning.

Answer: That is all, none but exhibitors are allowed to receive instructions in that room. That is the rule we made to start with and I think we will have to stick to it.

Meeting adjourned.

READING OF SCORES BY SECRETARY P. H. KIEFFER.

I would like to make a statement before reading the highest scores. I consider the scoring of butter at a convention a sacred thing and it should be guarded as such. I will explain to you the system followed here.

The butter, after it arrived, was stripped of the burlap or tub it was in, the address taken off and copied in a book, and then there was a tag similar to this (showing tag) tacked on the tub, with No. 1 written in black pencil and No. 1 entered in the book. The next tub was stripped, another tag put on and No. 2 put on with black pencil and No. 2 entered in the book with exhibitor's name. No. 3 was stripped and the tag put on and numbered No. 3 and the man's name entered No. 3, and so on until we numbered 136 tubs. There was nothing on the tub; everything we discovered on it, names, etc., were scratched off. There was nothing left on the tub excepting this tag,—this piece of paper. After that was done we went down and solicited the services of Mr. Kimball, editor of the Creamery Journal. He consented to help us, for which I want to thank him. We went up there, gave him a pencil and told him if he saw anything on the butter tubs that would indicate who it was from, or any mark or anything of the sort, to scratch it off and to change every tub about as he saw fit, then with a blue pencil to mark a number on the tag and the number that he marked on this paper he marked on the cover of the tub. He did that on all the butter. Then we pulled the tags off and kept these papers. He had the key to the tubs. I had the number and name that I entered but did not have his number. He had the numbers that would correspond with the numbers on the tubs; he kept this until after the scoring.

No. 99 in the blue is the one that scored the highest—W. S. Smarzo of Masonville; score 98—used Alpha Separator, Victor churn, Wells-Richardson color, Diamond Crystal salt. Next highest, J. E. Scott, Dubuque. He does not give any information how he made his butter. Score, 97½.

Calls for Mr. Smarzo and Mr. Scott.

THE PRESIDENT: Is Mr. Smarzo or Mr. Scott in the building? Will Mr. Smarzo please come forward. Mr. Scott is not present.

DETAILED BUTTER SCORES.

IOWA STATE DAIRY CONVENTION, WATERLOO, NOVEMBER 18, 19, 20, 1903.

Number.	Name.	Post Office Address.	Flavor.	Body.	Color.	Salt.	Package.	Total.
138			36½	24½	13	10	5	89
56	Allison, C. A.	Newell	40½	25	15	10	5	95½
16	Banta, A. E.	Wheatland	39	25	15	10	5	94
27			35½	25	15	10	5	90½
32	Bristol, G. A.	Primghar	38	25	15	10	5	93
50	Beckman, Geo.	Arispe	40½	25	14½	9¼	5	94¼
126	Bergesather, R. S.	Northwood	36¾	25	15	10	5	91¾
95	Benson, M. E.	Brandon	38	25	15	10	5	93
120	Botterman, D. A.	Waverly	37	25	15	9½	5	91½
112	Borglum, T. M.	Rutland	37	25	15	10	5	92
100	Baitinger, John	Ladora	39	25	15	10	4½	93½
66	Barker, J. A.	Monona	37	25	15	10	5	92
	Barber, M. L. (Dairy)	Marion	37¾	25	15	10	5	92¾
62			35	25	15	10	5	90
132	Capper, C. H.	Alta Vista	37½	24¾	15	10	5	92¼
135	Carr, Cecil E.	Frederika	39	25	14½	10	5	93½
40	Codner, W. B.	Parkersburg.	36	25	15	10	5	91
76	Conway, C. R.	Garner	37½	25	15	10	5	92½
121	Chadwick, R. W.	Waterloo.	38½	25	15	10	5	93½
115	Casper, F.	Guernsey	39	25	15	10	5	94
90	Cochrane, A.	Stuart	37¾	25	14¾	10	5	92½
92	Crocker, H. M.	Parkersburg.	39	25	14½	10	5	93½
87	Doleschal, A. J.	Miller	37	25	15	10	5	92
43			35	25	15	10	5	90
28	Dawson, J. F.	Iowa Falls	37¾	25	15	10	5	92¾
31	Evans, Wm.	Bradgate	36⅓	25	15	10	5	91½
81	Erb, R. J.	Arbor Hill	42½	24¾	15	10	5	97½
122	Elder, C. D.	Manchester	40¾	25	15	10	3	95¾
54			36	25	14	10	5	90
104	Edwards, L. S.	Waterloo.	37	25	15	10	5	92
134	Forrester, H. E.	Fredricksburg.	41	25	15	10	5	96
8	Flickinger, L. L.	Fredricksburg.	40½	25	15	10	5	95½
10	Frees, A. J.	Cedar Falls	38	25	15	10	5	93
14			34	25	14	10	5	88
29			27	25	14½	10	5	81½
34	Feldman, J. B.	Dyersville	37½	25	15	10	5	92½
73			30	24½	15	10	5	84½
77	Frandsen, A. M.	Stuart	36½	25	15	10	5	91½
7	Gibbs, L. J.	Waucoma	38	25	15	10	5	93
37	Gehrls, Wm.	Germantown	39⅓	25	15	10	5	94½
33	Gudvanger, Erik	Vinje	38¾	25	15	10	5	93¾
70	Goodnow, M. J.	Collins	37	25	14½	10	5	91½
78			32½	25	14½	10	5	87
86	Gallagher, James	Toronto	41¾	25	14½	10	5	96¼
80	Herden, Den	Hull	36¼	25	15	10	5	91¼
51	Herman, A. J.	Maple Leaf	36½	25	15	10	5	91½
96	Hessel, F. W.	Waterville	38	25	15	10	5	93
125	Helfter, C. L.	Osage	36½	25	15	10	5	91½
111			35	25	15	10	5	90
130	Hicks, O. W.	Guernsey	39½	25	15	10	5	94½
74	Hansen, A. M.	Silver Lake	41	25	14½	10	5	95½
65	Hill, L. D.	Humboldt	37¼	25	15	10	5	92¼
88			36	25	14	10	5	90
55	Jensen, P.	Exira	36½	25	15	10	5	91½
105			28	25	14½	10	5	82½
1	Jorgensen, Soren	Fredsville	37¼	25	14	9	5	91¾
84	Keachie, James L.	Dexter	38½	25	15	10	5	93½
42	Kolbet, P. J.	Devon	37½	25	15	10	5	92½
118			34½	25	15	10	5	89½
93	Kuennen, Ben H.	St. Lucas	39¼	25	14¾	10	5	94
49	Kallenbeck, Wm.	Bremer.	38	25	15	10	5	93
			35	25	15	10	5	90
193	Knief, Geo. H.	Minkler	37¾	25	15	10	5	92¾
133	Koenke, H. C.	Eagle Center.	36½	25	15	10	5	91½
106	Larson, F. L.	Dows	37¾	25	15	10	5	92¾

DETAILED BUTTER SCORES—CONTINUED.

Number.	Name.	Post Office Address.	Flavor.	Body.	Color.	Salt.	Package.	Total.
110	Lenius, Wm	Waverly	37	25	15	10	5	92
117	Larson, Peter	New Hartford	40	25	15	9¾	5	94¾
103	Lissner, Carl	Lake City	37	25	14¾	10	5	91¾
116	Landis, T. E.	Farley	38	25	15	10	4¾	92¾
64	Languist, G. L.	Saude	36½	25	14¾	10	5	91¼
46	Ladage, Herman	Buck Creek	38¼	25	15	10	5	93¼
52	Laird, S. W	Walker	40	25	15	10	5	95
13	Lehman, Fred	Coggon	36¾	25	14¾	10	5	91½
102			35	25	15	10	5	90
91	McFarlane, E	Odebolt	39	25	14½	10	5	93½
22	McCaffery, J. E	Earlville	36	25	15	10	5	91
114	Miller, H. N.	Randall	38	25	15	10	5	93
83	Miller, J. O	Milford	36½	25	15	10	5	91½
89			35	25	15	10	5	90
128	Mansager, M. J	Ellsworth	39½	25	15	9¾	5	94¼
38			35	25	15	10	5	90
75	Nelson, Christ C.	Exira	40	25	11½	10	5	91½
58	Neilson, J. P.	Brayton	40½	25	15	10	5	95¼
60	Nilson, B.	Swea City	37	25	14½	10	5	91½
25			34	25	15	10	5	89
136	Nelson, Chris	Garner	37	25	15	10	5	92
57	Olson, Adolph	Shell Rock	36½	25	15	10	5	91½
79	Olson, L. B.	Waukon	37¾	25	15	10	5	92¾
85			34	25	15	10	5	89
18	Odell, F. L.	Greenfield	39¾	25	14¾	10	5	94½
53	Paulson, A. G	Rock Valley	37¾	25	14	9¾	5	91½
119	Palmer, A. A	Manchester	41½	25	15	10	5	96½
113	Patterson, S.	Austinville	36½	25	15	10	5	91½
40	Peterson, L. C.	Rosendale	39½	25	15	10	5	94½
41	Pecinovsky, Frank	Schley	38½	25	15	10	5	93½
47	Pollard, W. K.	Thorpe	39	25	13¾	10	5	92¾
17			32	25	15	10	5	87
12	Peterson, Peter	Elkhorn	38	25	15	10	5	93
2	Peterson, S.	New Hampton	38¾	25	15	10	5	93¾
59	Remington, A. L	Dickens	38¼	25	15	10	5	93¼
124	Ross, J. J.	Iowa Falls	38½	25	15	10	5	93¼
107			35½	25	15	10	5	90½
109	Rohrssen, C. H	Klinger	36¾	25	15	10	5	91¾
71			33	25	10	10	5	83
56	Stolberg, Rasmus	Dallas Center	37½	25	14	10	5	91½
61	Seim, Theo. N.	Decorah	39	25	15	10	5	94
63	Stolberg, Knute	Pioneer	37¾	25	14	10	5	91¾
68	Savrid, P. J	Huxley	39	25	14¼	10	5	93¼
72			32½	25	10	10	5	82¼
69	Smith, John S	Preston	38½	25	15	10	5	93½
101	Sherk, H. A	Grand Junction	39	25	15	10	5	94
99	Smarzo, W. S	Masonville	43	25	15	10	5	98
67	Sorenson, Chris	Wiota	37½	25	14½	10	5	92
67	Schrieber, C. L	Four Corners	38	25	15	10	5	93
44	Schmidt, J. J	Almoral	38½	25	15	10	5	93½
82			34	25	15	10	5	89
98	Spohn, A. J	Miles	36	25	15	10	5	91
94	Stewart, R. J	Grimes	37½	25	14½	10	5	92
3	Scott, J. E	Dubuque	42½	25	15	10	5	97½
4	Stephenson, F. W	Dundee	41½	25	14½	10	5	96
9	Strait, Geo.	Marengo	39½	25	14¾	10	5	94¼
15	Squires, B. O.	Waterloo	39	25	15	10	5	94
24	Soles, Byron T.	Fern	37½	25	15	10	5	92½
23	Saveraid, R. J.	Slater	37½	25	14½	10	5	92
26	Storvick, T. A.	Lake Mills	38	25	15	10	5	93
39	Schreiber, Fred	North Washington	39¾	25	14¾	10	5	94½
123	Trimble, N. H.	Alden	39	25	15	10	5	94
45	Thompson, S. D.	Albia	39	25	15	10	5	94
20	Vargason, E. M	Jesup	36	25	15	10	5	91
131	Whalen, J. P.	Elma	39½	25	15	10	5	94½
5	Wood, H. S	Salina	38½	25	15	10	5	93½
11	Werder, C. H	Monmouth	37	24½	15	10	5	91½
35	Wick, Geo	Story City	38	25	15	10	5	93
21	Wallack, R.	Manchester	40	25	15	10	5	95
151	Wedemever, J. W.	Denver	37½	25	15	10	5	92½
129	Wendt, H. D.	Magnolia	39	25	15	10	5	94
127			38½	25	15	10	5	93½
48	Wiese, Rudolph	Prairie Rose	37½	25	15	10	5	92½
108	Yant, O. P	Manning	36½	25	15	10	5	91½

REMARKS BY MR. SMARZO.

Ladies and Gentlemen: I am a little like Mr. Wright,—I think my hair is standing right up, but I feel very much gratified to think I have won the prize. If I can be of any benefit to any of the boys, I would be willing at any time to give them any instructions I may be able to. I thank you.

THURSDAY MORNING, NOVEMBER 19, 1903.

Called to order by the president.

THE PRESIDENT: Our constitution provides that the officers of your association shall be elected at this time. I am somewhat disappointed at the size of the crowd here to attend this meeting, but we did all we could to get them here and feel that we have done our duty so far as that is concerned.

The first point is, how will you elect your officers?

MR. WRIGHT: Mr. President, I move that they be elected by acclamation.

Motion duly seconded and carried.

THE PRESIDENT: The first officer to be elected for the ensuing year is the president. Who will you have for your president for the year to come?

REMARKS BY MR. WENTWORTH.

Mr. President, Members of the Iowa State Dairy Association: I am greatly surprised to think that a man who has served as long and as thoroughly as our present president has, should have developed the egotism that he has this morning. Here he goes to work and apologizes in a sense and expresses his disappointment at the smallness of the crowd, notwitstanding that we who are here can halloo just as well as the whole association.

I propose, on the motion that was made by Mr. Wright, that we all have a chance to halloo just as soon as I name Mr. Shilling for president of the Iowa Dairy Association for the ensuing year, and I have the pleasure of nominating Mr. Samuel Bachelor Shilling.

REMARKS BY MR. NEITERT.

Mr. Chairman, I would like to be heard on this question. I am pleased to second this nomination. I understand it is somewhat embarrassing to our president to accept this nomination at this time. I know he realizes the responsibility of the office, the duties to be performed and the time it requires. I know he is modest and fears that this might be embarrassing to him; but I want to assure him at this time that no president in the history of this association has given better service or more generously of his time, has brought about better results and greater results to the Iowa State Dairy Association than our present insumbent, Mr. Shilling. We do not want to listen to any objections he may make but simply re-elect him, and I assure you that it is my belief the association will continue to grow even more than the wonderful growth it has shown in the past two years. I therefore desire to second the nomination of Mr. Shilling and trust he will allow the chairman to put the question.

The motion being duly made and seconded, Mr. Shilling was unanimously elected by acclamation as president of the Iowa State Dairy Association for the ensuing year.

REMARKS BY MR. SHILLING.

Gentlemen: I confess I never stood before you in my life that I did not know what to say, until now. While I appreciate the honor and while it is a pleasure for me to work for you, I can not feel that you have done the right thing in placing me in the chair as president of your association for another year. It has been a time-honored custom of the Iowa State Dairy Association to accord this office to one man not oftener than two years in succession, and this is the first time in the history of the organization in twenty-seven years that custom has been violated. I believe it is necessary to follow that custom in order to have the success that the association deserves, but I will say here I appreciate the honor and I will accept the office. (Applause.) I accept the office and, gentlemen, I thank you for it and I want to say here that I promise you now, as I did a year ago, that you shall have the very best that is in me for the year to come. I thank you.

THE PRESIDENT: The next is the nomination and election of your vice president. Who will you have for your vice president?

MR. WRIGHT: I nominate Mr. Barney of Hampton as vice president of the Iowa Dairy Association for the coming year.

Nomination duly seconded, and Mr. Barney unanimously elected vice president.

REMARKS BY MR. BARNEY.

When I accepted this office a year ago. at Cedar Rapids, I was rather loath to do so from the fact that I did not feel that I could give the time necessary, but I have felt greatly honored by being elected vice president and in view of the fact that we have such an able president I have had so little to do, although I hope to be able to do more during the next year, I will accept the office for another year. Thank you.

THE PRESIDENT: The next is the office of secretary. Who will you have for your secretary?

MR. OLSON: I will name our present incumbent, Mr. P. H. Kieffer. Nomination duly seconded by Mr. Gibbs, and Mr. Keiffer unanimously elected secretary.

REMARKS BY MR. KIEFFER.

Members of the Iowa State Dairy Association: I highly appreciate the honor that you bestow upon me and I will try and prove myself worthy of the honor. I heartily thank you for this and I hope that we may continue to have a large convention and get the support of the traveling men, as we have had it the past year, and the hearty support of the creameries throughout the State.

Since our president has made an elaborate speech here and has told everything there is nothing for me to say except I thank you and will accept the office and serve another year. (Applause.)

THE PRESIDENT: The next is the office of treasurer.

MR. SMARZO: The name of Mr. F. A. Leighton is placed in nomination. Motion made and duly seconded, and there being no other nominations, Mr. Leighton was elected treasurer for the coming year.

THE PRESIDENT: This completes the list of officers. I want at this time to appoint one more committee and that committee will be the auditing committee. I will appoint on that committee Mr. S. B. Reid of Des Moines, chairman, Mr. Joe Stanhope of Sioux City and Mr. Pufahl of Nora Springs.

Is there anything more to come before this meeting?

MR. NEITERT: Mr. President and Members of the Association: I desire at this time to announce that the executive committee has appointed your present secretary, Mr. Keiffer, as expert at the next annual contest, or six months test as it is called, of the butter scored by the National Butter-Makers' Association. The last scoring (in October) will be made at St. Louis.

Mr. Keiffer is well known to all of you and should receive due recognition of his work. I am pleased to know that the other members of the executive committee have recognized so worthy a fellow co-worker for the State of Iowa, and I hope and trust he will have the warm support of all of our members. Knowing him, as I do, to be intelligent, diligent, pushing and faithful in the cause of good butter; knowing him to be honest and capable of filling this position to the fullest, it gives me great pleasure to make this announcement, as the other members of the committee have so kindly suggested his name. I know it must be pleasing to every one of the members of the Iowa State Dairy Association and all the people of his acquaintance, and I can not think of any man in whose hands I would rather place this trust than in those of our present secretary, Mr. Keiffer.

THE PRESIDENT: I know I voice the sentiment of the members of the Iowa State Dairymen's Association when I say I appreciate the honor, and it is an honor, of having a man appointed from our State as a member of the National Butter-Makers' Association. It has done lots of good and I wish at this time to urge the butter-makers to give their support as heretofore. It has opened up the educational features of a six months' contest and I hope it will receive your support. I know I voice the sentiment of the entire delegation when I say it is an honor for the State and I thank you for it.

REMARKS BY MR. KIEFFER.

Mr. President, Members of the National Butter-Makers' Asscoiation and Executive Committee: I very much appreciate what you have done for me and I will accept the offer that you have made me and thank you for it. I will do the best I can in this matter, but at this time I want to make a plea to our butter-makers in this State. They have responded heartily to this convention with their butter; they have sent to this convention, as I understand it, the largest number of tubs of butter that has ever come to an Iowa State conventions of Iowa butter for a long time. They have responded nobly and I again appeal to them to do the same if the national test is held; and I assure them, so far as I am concerned, the treatment will be alike in all states, and I believe so far as the executive committee and your judges are concerned that the treatment will be alike. I am assured of that and I beg for your hearty support in this matter.

Thank you for what you have done.

THE PRESIDENT: Is there anything further before the meeting? For this afternoon we have a program of great interest. In addition to the fact that Governor Cummins will address you, we have Mr. Cobb, otherwise known as "Buff Jersey" with us, Mr. Mowbray of Minnesota and Mr. Kennedy of Ames, and we want everyone to be present. We want to give the Governor one of the most rousing receptions ever given at a dairy convention.

If there is nothing more before the house we will consider ourselves adjourned until 2 o'clock this afternoon.

AFTERNOON SESSION.

THE PRESIDENT: It is not often that the Iowa State Dairy Association is favored by the presence of its Governor; it is less often perhaps, that it is favored by the presence of a Governor who has attracted the attention of the nation Iowaward by the advanced position that he has taken upon all questions of public interest.

I want to reiterate just one word that I said last night—one statement—and that is I believe if it were possible to measure the advancement that has been made in the State of Iowa in the last year in the dairy interests, we would compare favorably, if not be at the head, in point of advancement. This is due almost wholly to the appointees the Governor has made, and I am glad to have an opportunity to say it in the presence of the dairymen of Iowa because they will bear me out in it. This, coupled with our dairy school, has brought about this result.

We have with us today that Governor, and I have the pleasure and the honor of introducing to you Gov. A. B. Cummins.

ADDRESS.

Gov. A. B. Cummins, Des Moines.

Mr. President, Gentlemen of the Association: The most perplexing thought that has filled my mind during this morning is why I was invited to speak to this association. You will share that diffculty before I am through.

It is true that I was born and raised on a farm, though I never heard of a Jersey, or of a Galloway, or a Holstein, or a Guernsey so long as I worked on that farm. It is a new thought to me—these classifications. The principal quality that we sought for in a cow in the country in which I was born and raised was that she should be a good climber, for upon the mountain-sides of Pennsylvania it required a sure-footed animal to gain an existence. I feel, however, all the honor that this invitation involved. It is a great pleasure to me to stand for a few moments before you, while you interrupt and suspend your ordinary proceedings, and while I can not hope, I do not hope, to interest you in the particular calling or business in which you are engaged, I doubt not that we can spend a few minutes looking at some matters from points of view that are not wholly technical with advantage.

While I do not know much about butter-making (in fact, the most painful memories of my life are the hours which I have spent at the churn; you have not that to do nowadays, I fancy) I hope I am not quite as bad as my friend, Mayor Caldwell, of Sioux City. Some of you may know him; we call him in Iowa "Happy Cal." He used to be an editor at Sioux Falls and he reached the conclusion that the work of publishing a newspaper was altogether too hard and that he would go to farming, and he knew just about as much about farming as a hog does about literature. But he bought a little piece of ground and moved out on it, and shortly after he had settled there the farmers had an association in the neighborhood and he was invited to attend one of its meetings. He went, and the subject of that particular meeting was sheep raising, and "Happy Cal" was very much interested in the discussion which took place. First one man arose and spoke about the merits of the Cottswold ram; another arose and expounded the merits of the Southdown ram, and another spoke on the merits of the Shropshire ram, and so it went. And finally the president, seeing Mr. Caldwell in the audience and knowing he was a stranger, said he had no doubt the meeting would be glad to hear from the new comer, Mr. Caldwell; and he arose and said that he had been much interested in the discussion of the merits of these various kinds of sheep; that the truth was he was thinking of going into the sheep business himself and that he wanted a little light, and that he would like to have the opinion of those who had experience in the business, considering the climate and the soil and everything connected with the business,—he would like to have their opinion with regard to the merits, not of the Cotswold ram, or the Shropshire ram or the Southdown ram, but of the hydraulic ram. (Laughter.)

Now I know a little more about butter and butter-making than my friend Caldwell knew about sheep raising, but not much. I know enough to know that you are entitled to be congratulated for membership in the largest, probably, as well as the most persistent and most flourishing association that is allied with the products of agriculture. I know enough to congratulate you upon the inestimable benefits and advantages that you have conferred upon the State of Iowa by turning intelligence and scientific investigation towards this subject. I know enough about the business to be sure that the product in which you most largely deal in this group of states, in the three or four states surrounding Iowa, and Iowa, and I know that it rivals in its color and surpasses in its value all the gold dug from the bowels of the earth between the two seas. And so it gives me the greatest pleasure to occupy your time for a few minutes,—just how I do not know, but I will discover as I go along.

The first thing that I am moved to say is something with respect to the State of which many of you are citizens. I welcome these men from other states here, but it embarrasses me. I am glad they are here, but I am always reluctant to say what I think about Iowa in the presence of citizens of other states, lest it shall hurt their pride and their feelings; but I know that you will attribute anything that I say not only to some desire to adhere to the truth, but to the pride and loyalty I feel in the State of which I happen to be governor at the time being.

Iowa occupies the most beautiful spot upon the earth's surface. Now that is not the statement of one who is unduly fond of Iowa. It is the statement of an accepted fact, not only here but throughout the whole country. I believe it to be true that if you had the earth's surface in which to carry on an investigation, if you had to select from every sovereignty and every people, and were to select that place where Nature has bestowed her most benignant smile, I believe that territory between the Mississippi river and the Missouri river and Minnesota and Missouri would be chosen as the most blessed spot on earth. (Applause.)

There is no equal area that incorporates so many of the things that Nature has given to mankind for his use; there is no other territory in the world of equal size of which this can be said—that there is 97½ per cent capable of successful and profitable cultivation. There is no other State in the Union which approaches that percentage so closely as to be a reasonable second. 97½ per cent of all our area,—hillside and valley, river and hill and prairie—97½ per cent of it may be put under cultivation and will yield a profitable return for faithful labor!

You have already heard with regard to its capacity in your particular direction, but I happen to remember a statement made not long ago in my presence, and I believe it to be true, that the hens of Iowa cackle every year over a product that is worth more than the whole agricultural output of many of the states of the Union. (Applause.) That may sound a little bit enthusiastic but it is actually true. But may I say, before I float away further upon the waves of my own enthusiasm, may I say that these treasures which God has hidden in our fields and upon our prairies, these wonderful riches that he has bestowed upon us, they are not the shining, the crowning characteristics of the State of which we are citizens. Her men and her women are the bright jewels in our crown of statehood. Somehow or other it seems to me that Iowa, by the interposition of Providence, has been set apart for the fairest and the best experiment in few instances among men. There are fewer evil influences about the people of the State of Iowa than any State in the Union. This is probably true because of the prominence of the interests which you represent and which does not involve the crowded, the very crowded population which are characteristic of many of the states. Then we are particularly happy, too, in the pioneer period of our State. The early settlers of this commonwealth gave it an impulse and the direction from which it can never escape. and it moves as by tradition and by instinct into paths of righteousness and safety and of conservatism. But these men and women who now occupy this kingdom in everything that tends to make life lovely and sublime (I do not discourage the men and women of other states; they are the best in the world save our own)—these men and women who now inhabit this empire in everything that tends to make life complete and happy and content, have neither parallel nor companions upon the face of the earth in education, in the diffusion of intelligence and in respect for law and order, in the beauty and sanctity of their homes, and above all in the comparison of these things in the ease and dignity with which they pass from rank to rank in life; as I said a moment ago, they are without parallel or companions in all the world.

I have used the word ranks, and that has gotten to be an unpopular word in these later days, but I used it advisedly for the people of Iowa understand that there are ranks in life. There are ranks in society, there are ranks in literature, there are ranks in art, ranks in everything; but they understand that it is the genius of our institutions that these ranks are always and ever open to every man and every woman who has the courage or spirit to enter them. (Applause.)

I compliment this association most heartily upon the direction which it helps to give to the thought of the age. I am delighted in these days of turbulence, in these days when civilization has become complex and it is difficult to unravel the intricate thoughts that bind us together, I compliment and congratulate you that you are doing something, doing much to dignify, dignify the cause, if I may so term it, of human labor. These people of ours, not in Iowa but throughout the United States, the first people in all history who have assigned honest, faithful labor to its true place in the economics of the earth, and you are teaching—you are teaching the world that agriculture, that labor is not only honorable (it has always been honorable), but that it is dignified as well as honorable because you are bringing thought, investigation, research, intelligence to the work at your hands. It is one of the happiest comments of this state, or of any other, that the people begin to understand that agriculture in all its phases is a scientific pursuit, and that the man who accomplishes victories in this field must have a mind as well trained and a hand as steady and true as the man who accomplishes victories in any of the learned professions,—and that is the reason that you are doing much, not only for your own following, but for the world, in making it understand that there is such a thing as nobility and dignity and high-mindedness and high citizenship in these ranks.

And that leads me to a suggestion, because I am not going to talk about butter. I do not know how many different kinds of cows there are; I do not know there is such a thing as a dual purpose cow and a special purpose cow, but then I do not know half as much as you do, and it would be folly for me to stand here and attempt to teach you the alphabet in a learning in which you all hold post graduate diplomas.

I shall not attempt it. But for the moment I represent this State and I have a deep interest in it and I have a deep interest in all the means and methods through which its people are to be lifted up to a higher plane of living, and through which its various enterprises may be carried forward to a still more splendid success.

I have spoken about the dignity of your business and of all agriculture, and that leads me naturally to say a word not in behalf of an institution but of an institution which I think is entitled to as much credit for the wonderful things that have been accomplished in agriculture as any other in the world; an institution which in my humble judgment means more for the people of Iowa than any other in its midst. I stand for all our institutions of learning; they are all associations of which we may well be proud and to the support, the enlargement, the development of which every citizen ought to give his best thought. But in this present instance, speaking to the dairymen of the State of Iowa as the men who are particularly interested in the profession (because I shall henceforth call it a profession), the profession of agriculture, I want to remind you that we have in this state an institution of which all its people should know more, and towards which all its people should stretch forth a more helpful hand than has hitherto been tendered to it —I speak of the Iowa State College of Agriculture and Mechanic Arts. (Applause.)

I believe that this institution is doing as much to confer honor upon the men of Iowa as any other in our midst; I believe it is doing more to make the business in which you are engaged profitable than any that we have ever founded amongst us, and we have, and it is with pride and with gratification that I mention it,—we have at the head of the agricultural department in this great college a man who leads the world in the field to which he has devoted his life—I speak of Professor Curtiss. (Applause.)

All this should stimulate the pride of an Iowa man. But I am not now speaking as a member of its board of trustees. I am not here soliciting alms for it. It belongs to you, it does not belong to me, it does not belong to the members of the board of trustees, it belongs to you; and I lift up my voice for it this afternoon because if we would maintain it at the high point that it has already attained, if we would give it additional efficiency, if we would bestow upon it additional helpfulness, it needs the sympathy, it needs the good will, it needs the interest of every man in this broad State who is interested either in agriculture or in the mechanic arts.

I have been boasting a good deal this afternoon and I have a right to. I have boasted of the things that God has given us. But there are some things I can not boast of. The things that man can give us I am not able to place upon the high pinnacle to which I have those of bounteous Nature. This institution of ours, well equipped as it is with the best intelligence of the age, can not maintain the elevated position that it has acquired unless we can keep pace with developments in other states and other countries. Why we need for this institution at this time a million dollars to expend in building. Now this seems a large sum, does it not, but we have twelve to thirteen hundred of the strongest, the most loyal young men and women gathered in this institution at this moment that ever came together for the purpose of developing their minds and strengthening their bodies, and we are housing them in barracks that the army of the United States would reject for its regular army. This is a misfortune to some extent and we are going to remedy it as soon as we can; but we have been floating along here on the tide of prosperity and have been forgetting that here was the instrument, the weapon by which these battles were fought, and they need sharpening every day.

I am not here to take up a subscription, mark you, but I want you to feel well towards this institution, and I want you when the legislature comes to consider what it should do for its enlargement and development, I want you to look upon the work of the legislature with a sympathetic and generous eye. It seems to me that the people of this State are already reaping the profits of the work done in this field of labor. I honestly think that the agricultural department of the college at Ames will add 33 per cent to the value of every acre that is planted in corn in this State within the next five years. I say that with knowledge. I know more about that than I do about butter-making. I know that if the work being done here in the way of these investigations of science, coupled with this ancient and honorable profession of agriculture, if even the propositions which this college, and all agricultural colleges, for that matter,—because it is not singular in that respect,—if the propositions which they are putting before the farmers of this country receive encouragement and are adopted, every acre of land in this State devoted to corn will produce within the next five years 33 per cent more than it now does. No doubt that the light with which it and other institutions have supplied the business in which you are engaged has added equally to its profit, to the productiveness of the capital which you have employed.

Now I want to say another word, and here I may tread on somebody's toes—I don't know. What I have said up to this time I am sure you will all agree with; but I now come to a point that I have in mind and it has become a sort of fad with me, I suppose, yet I believe deeply in it. Here we are in Iowa, a great agricultural State it is now, and it always must be the greatest agricultural State in the Union. I repeat that there is no State in all the splendid sisterhood, taking all the products of agriculture together, that is even a fair second to this commonwealth. And that is because we have the best opportunity of any other State in the Union. It is not because we know how to improve these opportunities better than our brothers in other commonwealths. But don't you believe that your butter would be worth more if it could be consumed in the State of Iowa rather than sent to Chicago and New York, or to the ports across the sea? In other words, I plead for a diversification in industries in Iowa. I never expect to see this State standing at the head in manufacturing; I never expect to see it lead the procession in the great industrial fields other than agriculture, but I do believe that there is opportunity here for a much higher place in the ranks of manufactory than we have hitherto attained. Why the tendency of this age is to take the manufactory to the raw material.

That is naturlal. It is logical. There are reasons for it which appeal instantly to even the casual thinker. There are a great many exceptions to this tendency, but if you will look over the work of the world you will find a growing and as I think irresistible tendency to carry the manufactory to the raw material.

What is our raw material in the State of Iowa? First, cattle; second, hogs; and I assert to you, and it is a subject to which I have given more than ordinary attention,—I assert that not a fat steer or a fat hog should ever leave the borders of the State of Iowa to be manufactured into their ultimate products. Take hogs, for instance. It is a blasphemy, almost, to haul hogs three hundred miles or four hundred miles. Take a fat hog,—a carload of fat hogs at Kansas City, and transport them to Chicago, and I care not how good attention you give them in transportation, there is an actual loss of anywhere from 1½ to 3 per cent in meat tissue. That is a loss that can never be repaired. It is irreparable. I do not mean to say that the animal can not again take on his original weight, but if he does he takes it on at the expense of the food that is given to him to replace this loss.

Now tell me, if you please, why should hogs be taken from the State of Iowa to Kansas City or to Chicago or anywhere else to be manufactured into meat products? Tell me why your fat cattle should be transported by the hundreds of thousands of train loads from year to year to be manufactured in Chicago or elsewhere? There is no reason. But you ask why it is done. I will tell you why it is done: it is done because the adjustment of the railroad rates between the live animal and the dead product is unfair. There are one or two manufactories in Iowa which by reason of their being close to the Mississippi river, and others possibly at the Missouri river, that are able to survive the unfairness in these rates; but manufactories scattered over the State of Iowa can not compete. Mark you, I am not here an advocate for the reduction of railroad rates. I do not know whether railroad rates are too high or too low. I am not quarreling with the returns which the railroad companies are securing upon the business which they do; but I do say that, whether intentional or otherwise, the rates between live stock and dead product are so adjusted that the business which we ought to do, not only for economy's sake but for prosperity's sake, we do not do. Railroad rates in this State, so far as their adjustment is concerned, are much like Topsy,—they have simply grown. They do not bear that relation to each other which a scientific investigation of the subject would require.

You know, as well as I, it is not a question, it is not a technical question, but you know as well as I that the railroad company ought to be willing to deliver a packing house product cheaper than it transports the live animal. There are a great many reasons which lead to this conclusion, reasons which have been investigated, because I am not suggesting anything new, and I am suggesting it to you because it is a matter of vital importance, not only as citizens of this State, not only as men who are interested in seeing a general diversification of the work, of our people, but as men who are interested in seeing a market for your product created within the limits of your own State. That is the policy. That is the policy of this country; it has been the policy of the country since its birth, so far as it concerns foreign nations. Now, why ought it not be the policy of the State of Iowa to create these markets in our own cities, and these homes of industry upon our own prairies?

It is something that is worth thinking about and it is not impracticable. It simply needs the united forces of intelligent effort to accomplish it. It is not a war upon our transportation companies. I look upon them as the great arteries of commerce and indeed the pioneers of prosperity, and I for one should not under any circumstances suggest any course that would bring misfortune or adversity to them, because without them and the help they give to the business of this great country, we could not exist a single fortnight. But I do quarrel, and I leave it with you,—I do quarrel with the adjustment of these rates that prevent the State of Iowa from obeying an economical law of production, viz. that our raw material shall be turned into the finished product adjacent or approximate to the fields in which this raw material is produced. (Applause.)

I have said a great deal more than I intended to, but it is one of the questions which the future will require you to answer, and while we are not jealous of the prosperity of Illinois, or of Nebraska, or of Missouri, I think we have a right to look to our own interests first, and I commend this subject for your thought and for such discussion in the future meetings of your association as you think its merit or its importance entitle it to.

Now just one word more upon an entirely different subject and I shall finish. It is a great wonder that I have not floated off into a Republican speech before this time; but I have been making Republican speeches for two and a half months now, until my mind is saturated with that kind of thought, and I am going to make a reference to a political subject. Not partisan—not partisan.

You have heard a good deal in the last year or two in this State about "stand pat." I am not a "stand patter", as you all know. I am not using the subject in reference to tariff, not at all. I want to compliment you because you are not "stand patters" in the business in which you are engaged. There are a few great principles true yesterday, true today and they will be true tomorrow, upon which we must stand pat; but their application to the affairs of men change, changes with the rising of each sun, and what I am prouder of than anything else is that this association and all the associations throughout this State and other states of the Republic are moving on, moving on under the impulse of higher thought and of greater knowledge; moving on with safety under the illumination which brightens and lightens the path of the workman and the thinker of this day. Because the great danger (if there is a danger in this country, and I am not a pessimist about the future of this country; I have no more doubt about it than I have of my own existence), but if there is any danger at all that is plain in our path over there, it is because we have come to think that the work of the world has been done, that we can securely rest upon the achievements of our ancestors or contemporaries. We come insensibly sometimes, in the very flood of great prosperity, to think that all has been done that ought to be done, and it is to dispel that thought, or rather that illusion, that you will allow me a concluding word.

You have heard, I suppose, a great many times, some ambitious and glowing Fourth of July orator declare that the age of experiment in the Republic had passed; that when Grant refused the sword which Lee offered him at Appomattox it became an equal structure in the architecture of nations. Now I would not for the world clip the wings of any imaginative orator; I would not for the world dampen the enthusiasm of any lover of his country, but let me say to you that the age of experiment has not passed, it never will pass and it never ought to pass, because the very moment that the faith and futurity of this great country of ours do not depend upon the intelligence and conscientious performance of the duties of citizenship, that moment we have begun a decadence that will end only in the failure of the fairest experiment in free government that the annals of the human race have ever seen.

Therefore I say to you, not only with respect to the material things of life, not only with respect to the business in which you are engaged, but with respect to those higher duties which affect not only yourself but your fellow men as well, which affect not only the present moment but the future as well, be as diligent, be as progressive, be as alert in the discharge of these high duties as you are alert and coscientious in the discharge of these things which affect your immediate profession or avocation.

Remember that in this growth of which we are so proud, and of which we are a part and to which you have contributed, we have developed problems the like of which our forefathers never knew. This great prosperity in which we all so much rejoice and which we so fervently pray may be continued, this great prosperity is thundering into your ears and mine, questions that must be answered—must be answered right if we are to preserve even what has been so sacredly handed down to us by our forefathers. I am glad it is so. I am glad that you must fight in order to preserve yourselves. I am glad that it is necessary that you should be active in order to accomplish victories, or even enjoy those which have been accomplished. And these problems.—I will not mention them now because they are floating through our minds all the time,—you can not take up a paper but that you will see them set in every column; you can not read a periodical but that you will continually hear these questions humming and drumming in your ear.—and how are we to answer them? By shrinking cowardly back and saying that we stand upon and by what has been already said and already done? No! Every day creates not only its conditions but it creates its difficulties as well, and while you are going about in this world attending to your own affairs remember that you have to attend to somebody else's affairs, too. The school of which I spoke a few moments ago, it may,—possibly its dominant need is to teach John how to take care of himself. I am now talking of a larger school, a post graduate university, the university of life in which we have to teach John not only how to take care of himself but how to take care of others as well.

It is not enough for any man to fold his cloak around him and say that it is well with me. He must ask his neighbor, "Is it well with thee?" and unless we do take on this higher and greater civilization, unless we do occupy this higher and, as I think diviner point of view, it will not be well with us. I am not a disciple of the maxim, "Let well enough alone," for it never was well enough with any man, with any nation or with any people. I do not think, as I said before, that I have the slightest doubt with regard to the future.

When I see here sometimes my young friends lifting up into view and picturing with all the eloquence and the enthusiasm of the young the master minds of former times, those great spirits that dominated former generations and former centuries, I know, although he does not, I know that there are giants in these days as well as in former days. I know that the man and woman of this age are treading their way easily through difficulties and through intricacies before which these great spirits, luminous as they are of former times, would have recoiled in utter helplessness. So do not think that I have any doubt with regard to the future, but I preserve my confidence simply because I know that what you have to do, you will do well and you will do righteously and conscientiously.

I know that from time to time, as the laws of your country give you opportunity to do so, you will express your opinion with regard to public affairs; freely, independently, conscientiously express them so they can be heard through the civilized world. I have no doubt with regard to the future of the republic, or the future of this commonwealth, so long as every man will, when the time comes, approach the polls and there declare what he believes with respect to his fellow men and to the government which binds him to them.

And so my first injunction is not energy in business, because there is another motive that prompts you to that, but it is energy in the discharge of your public duty, not only energy but fearlessness and intelligence as well.

No, I repeat that although I am conscious, perfectly conscious, that we have these great problems before us,—and they are all about us now,—I look off into the future and I see problems vital and important, but I do not see any that an educated and patriotic intelligence can not solve; I see difficulties over there that are mountain high, but I see none that courage can not overcome; I see warfare, ceaseless, never ending, perpetual warfare, but I see gallant soldiers in the army or reform, in the army of righteousness, and, thank God, I see no defeat.

THE FARMER'S COW—HOW TO KNOW AND HOW TO FEED IT.

Professor Kennedy, Ames.

Mr. President, Ladies and Gentlemen: I assure you that I am glad to be here this afternoon to speak to the members of the Iowa State Dairymen's Association and visitors.

You have heard a great deal from our Governor in regard to the prosperity of the State of Iowa—Iowa, who stands first in agriculture in comparison with all the other states of the Union. This afternoon I wish to take your attention for a short time to discuss one phase of agriculture which has not been taken up yet. I wish to take your time for a short while to discuss the farmer's cow, how to know her and how to feed her.

I may say that in my estimation the farmer's cow has probably done more towards development and prosperity of agriculture in Iowa than probably any other one line.

In the first place, as Governor Cummins has already said, we have several kinds of cows. We have the special purpose cow, the dual purpose cow, the beef cow, and so on. This afternoon I do not wish to discuss the special purpose cow, or the dual purpose, or the beef cow. I am simply going to talk a little while on what is considered the most profitable farmer's cow.

In the first place we have several breeds of cattle. We have several breeds of dairy cattle, cattle which are intended and bred especially for the purpose of dairying—for the production of milk. We have in addition to that, breeds of cattle which are bred for the one purpose of beef production; furthermore, we have other breeds of cattle and other types of cattle which are bred for the combined purpose of producing beef and milk.

In certain sections of this country there is no doubt but what the special purpose cow, of which the Jersey, the Guernsey, the Holstein, Ayrshire and some other breeds are representatives, that that type of a cow is the most profitable for a farmer to own. In other sections of this country, in the West, for instance, where land is cheap, where land can be had for almost nothing, there is no doubt but what the beef cow is the cow for the farmer. In other sections, of which Iowa is a good example, there is another type of cow which in many instances can be handled profitably, that is the dual purpose cow—the cow which gives a fair amount of milk and at the same time produces a calf which makes a fairly good steer when sent to the market. I wish to make myself clearly understood in this connection. To not misunderstand and think that I stand here for a moment and say that this dual purpose cow is a more profitable cow than the dairy cow for a farmer to own; but I may say under the most intensified methods of farming, where dairying is adopted, that the cow which will last longer is the special purpose cow. That cow will last and will be present after the other types are gone. A special purpose cow demonstrates that she will produce butter at a lower cost than any other type, but Iowa is different from other sections of the country as this is a great beef State. Our farmers have lots of rough feed, they have lots of corn fodder, they have lots of forage in the shape of hay, they have lots of corn, and in their work they follow diversified farming, that is, in many sections a certain amount of dairying is carried on. In all sections there is a great deal of beef production, so the cow which will combine both beef and milk is the cow which perhaps appeals more to the farmers than any other class of cow. Some men have gone so far as to say that it is impossible to get this kind of a cow.

For the past ten years we have had at the college at Ames an experiment station. We have kept there different breeds of cows. Have kept accurate records of all the feed they have consumed. Morning and evening we make notes and record the amount of milk given by each cow; morning and evening we have collected samples of the milk given by each cow and have had them tested so as to know exactly how much butter fat each cow gave us; at the end of the year we have the total amount of milk given by each cow, her average test in butter fat, the total amount of butter produced, the cost of feeding the cow for the year and the cost of producing one pound of butter. In addition to that we have kept the calves from these cows, have fed them on skim milk and after a while sent them to the market, where they were slaughtered for beef purposes.

In the first place, I wish to be understood on this point; that is, there is only one way to know a dairy cow, and that is by the use of the Babcock test and the weigh scales. That is the method we are following; but still a great many people would like to know a few other pointers which will help them in the selection of cows. There was a time when we had many men who claimed they could look at a cow and tell you how much milk she would give; that they could go into a ring where there were a dozen cows and could tell by certain points which were the best of the dozen. I have been called upon to judge cattle at the state fairs, county fairs and international fairs, and in judging dairy cattle I have never made the claim, and do not intend to now, that I can go into a ring where there are a dozen good cows and pick out the one which will give the most milk, because I can not do it by looking at it and neither can any man living. There is only one way and that is by weighing the milk and testing it.

Still there are several points which serve as a basis, that is, we can tell between the poor cow and the good cow, we can judge perhaps between the good and the medium cow. I wish to call your attention to some of these things which indicate dairy capacity. Now the dairy cow is simply a machine. Governor Cummins has spoken this afternoon about the advisability of increasing our manufacturng industries in this State. I believe dairying is the greatest industry we have in the State at the present time. The farmer grows the feed; he has the cow; she is the machine for converting the raw material into milk; it is taken to the creamery, where it is separated, the cream taken from the milk and converted into butter. The dairy cow is simply the machine. That would lead us to believe at once that one thing a cow must have is capacity; she must have room for consumption of a large amount of feed. Capacity is judged by depth of body and length of body. This is an important point that she has a good barrel or body; that indicates that she has room for a lot of feed and that is an important factor.

Another point we must consider—that is the udder. It is in the udder the business is done. That is where the milk is manufactured. and the udder should be large when full of milk, and when you are through milking I like to see a cow whose udder milks down well. I do not like to see a fleshy udder. Have the udder large, extending well back and well down. Now we have all heard a great deal about having a cow with udder square, that is each quarter should be properly developed. That is something which looks nice, but in actual dairy business you will find lots of your best cows are those cows which have not the nicest balanced udders; but from a practical standpoint it does not matter so much whether a cow's udder is properly balanced if she has a good large udder, one that milks down well, and good milk veins. The milk veins, that is the veins which come from the udder—I like to see them large and numerous, two or three on each side, and have them large and the milk wells, have them large, and the milk veins should be crooked.

After you have taken these points into consideration I do not think there are many other points. Get a good body, a good large udder, large milk veins and large milk wells. These are things always present in a good cow and not very generally present in a poor cow; but between two good cows it is hard to tell which would give the greater amount of milk.

I have here an enlarged photograph of a cow which we own on the college farm (shows picture). She is a pure bred Shorthorn called "College Moose." She is a cow that a year ago, just before she had her calf, weighed 1,700 pounds. This cow a year ago won second prize at the Chicago Live Stock Association, in competition with all grades for the best farmer's cow. As a cow she stood first and on her milk record she stood first, but her calf was sick for two months before the exposition and, as the calf counted more than the cow or milk record, she fell to second prize. When this cow is in high class she weighs 1,700 pounds. giving 8,734 pounds of milk, the average test of which is 3.8 per cent, and she has made over 400 pounds of butter at a cost of a little over 6 cents per pound. This cow has calves which are fit to go on the market and top the market from a beef standpoint. We consider her a very profitable type of cow.

I have here on this chart (shows picture) a Jersey cow known as "Nicollett," and she is an exceedingly good cow. This cow has a record of 5,787 pounds of milk, testing 7 per cent. She has an average of 7 per cent for the year and has made 513 pounds of butter at a cost of 4.7 cents per pound, 1 1-3 cents less than the pure bred Shorthorn cow. Some characteristic things about this cow is a good deep body, length of body, large udder, large milk veins.

Here is a cow (shows picture) another pure bred Shorthorn cow owned by the college. This picture was taken when she was dry. She differs from some of the others in some points. She has not as much depth of body as some of the other cows; she has a long body and she gets her capacity in length of body. She has not a fancy udder; she has a good hind development but her forward udder is light. Her record is 9,326 pounds of milk in twelve months, average test 4.12 per cent, and has made 449 pounds of butter, and it cost 5 cents per pound. You would not think to look at her she was a very high type of dairy cow, but still she is a producer.

We have here a pure bred Holstein (shows picture). She has a wonderful depth of body and good length of body, an exceptionally fine udder, very large milk veins. She is a heavy milker. I have not her record for a year but this cow made 72¾ pounds of butter in thirty days, net profit $8.75 over and above her feeding. A pure bred Holstein cow. She gave a large quantity of milk tested fairly high, consumed considerable feed but still the most profitable cow in the herd.

I have here a Red Poll cow (shows chart) which has made over 300 pounds of butter in a year, and I have on this chart here an Aberdeen Angus cow. She has a record of 336 pounds of butter in a year.

You are shown on these charts the best cows of different breeds. We have found good dairy cows in the Shorthorns, in the Aberdeen Angus, in the Red Polls, and exceptionally good in the Jerseys and Holsteins. Here is a cut of a Shorthorn steer (shows chart) born on the college farm out of one of the Shorthorns which I have shown you. I merely present this cut to show you the possibility of producing beef from a cow that is also a good milk producer. This steer's mother made us over 400 pounds of butter in a year. He was brought up on skim milk and at 26½ months old weighed 1,640 pounds. That made an average gain of over two pounds per day from birth, and was one of six steers that dressed out 64.9 per cent on the Chicago market and was good enough to sell 10 cents higher than the market on the day sold. This simply shows you the possibility of producing calves and milk from the same cow.

Now after you have selected the dairy cow, probably one of the most important points is the questiono f feeding, that is feeding your cows economically. Feed them so as to give the best results. In feeding it is all important that we have a thorough understanding of feeding rations, that is the balanced ration, as it is often called.

We have a list here of the ordinary feed stuffs grown upon the average farm, and the ordinary feed stuffs which are purchased by the average farmer to feed his dairy cows. The first column represents 100 of each of the different kinds of feed stuffs. The blue material represents water. In each and every kind of feed stuff there is a certain amount of water. The red on this chart represents the protein. In analyzing the feed stuffs the chemist finds one constituent he calls protein. This represents the digestible protein. This protein in the food is used for the purpose of nourishing the body, of producing hair and producing nerves, and so on, and it is from the protein part of the food, so far as observations of the present day show, that the milk is produced. That is the red part of the food, so in feeding dairy cows it is all important that you feed them on those feed stuffs which are rich in this red material, because that is the part which is turning the food into the production of milk.

The black parts shows the carbohydrates. The carbohydrates are simply the fat and heat producers. We have here in the yellow the fat of the food and in the brown portion we have the part of the feed stuffs not digestible, also the ash. This includes the ash and that part not digestible.

In this column we have the nutritive ration. Now this is another column which you should study carefully. As I said before, the protein is the part of the food which is mainly concerned in the production of milk, so from a dairyman's standpoint it is important. The nutritive ration of corn is 1--7. Now think of it as this, that for every pound of protein there is 9-7 of the black and yellow. That is what it means. That for one pound in the corn, of protein there is 9.7 per cent of carbohydrates and fat. In oats there is 6.2 per cent in a pound.

In the feeding of dairy cattle total results of experiments conducted in this and different colleges, they have found they get the best results when they feed one pound of this protein or red material to 5½ to 6 of the black and yellow. That is what we mean by balanced rations. One pound protein for every six pounds of carbohydrates. Corn is too wide, we will say. That is for one pound of protein there are over nine pounds of the other things, over three pounds too much, probably four pounds more of the black and yellow than there should be.

Take in the case of oats—we have one pound of red to over six and two tenths pounds of black and yellow. Oats are a much better feed than corn for the production of milk and give much better results; but corn is the staple feed in Iowa, and in the feeding of dairy cattle, or in the feeding of beef cattle of any kind, or live stock, the ration must be composed largely of corn in Iowa, simply because it is the feed grown in this State. Because corn does not contain enough red material in proportion to the black and yellow is no reason we should discard it. We should balance it up. Simply where one stuff is lacking in one kind of material we should add some feed stuff which has that material that is lacking in the other, such as gluten feed and gluten meal to corn. Oil meal is rich in red material; bran is rich in red material; peas are rich in red material, and a great many feed stuffs we have contain more of this red material and should be added to the corn.

Oats is a properly balanced food, but oats are too high as a general thing. When oats are worth, say 20 to 22 cents a bushel they are pretty expensive from a financial standpoint, but in the feeding of dairy cattle we must take the cost of the food ration into consideration.

In feeding stock we must first have the ration balanced; second, the cheapest ration we possibly can get; and third, a ration the animals will eat. When other feed stuffs are very high, oats are sometimes cheaper at 25 cents a bushel than other times at 18 cents. It depends on the price of other feed stuffs.

Rye as a nutritive ration is 1 to 7. Rye can often be used, providing you use bran, oil meal, oats or some other food rich in protein with it. The same of barley; barley is rather too wide.

Bran contains 12½ per cent of protein and has a nutritive ration of 1 to 3 to 7. The proper balance for the dairy cow is 5½ to 6. Bran as a nutritive ration alone is too narrow. Taken on that as basis, bran is a good thing to add when corn, rye, wheat or barley or any feed stuff is employed. Shorts are very similar to bran, but shorts are much better for swine feed than for dairy cattle. Take in the case of swine we want to concentrate feed. In the case of cattle of any kind we want it bulk.

Gluten feed is used largely at the present day. At the experiment station we are feeding a great deal of it to cows, also to fattening cattle. During the past three or four years we have carried on a good many experiments in the feeding of gluten feed, oil meal and cottonseed oil. Experiments show one about equal to the other, and it will depend upon which you get cheapest. If you can buy oil meal as low as gluten feed, feed it. It depends largely upon the price of these stuffs. They will all give good results, and the feed which can be bought for the least money is the stuff to use. Just at the present time gluten feed can be bought for a little less than any of the others, and gluten feed at $19 per ton is as cheap when fed as bran at $10, so it is a much cheaper feed than most on the market.

Gluten meal, though used largely several years ago, at the present time is little fed in this country, due to the fact that firms which manufacture both of these stuffs or by-products are the glucose factories. The gluten meal is the gluten out of the corn; the cob bran which is given up here is the shell of the corn. Gluten feed is a mixture of gluten meal and corn bran.

We have here corn cob meal, and while a good feed oftentimes, should be mixed with gluten feed, cottonseed meal or some feed rich in protein.

We have on this chart a continuation of feed stuffs and the different kinds of straw and fodder. We have here corn fodder; it makes a good feed—too wide in nutritive ratio, but all right to use with such as bran, oil meal, gluten feed or some of those feeds. The same thing is true of the different straws.

We have down here sorghum, this is the corn sorghum, a very good feed, but too wide. We have here oil meal, old process and new process. The difference between old and new process is that the old process oil meals contain 4 per cent more fat. Generally speaking, the old process is worth $1 more than the new.

We have here dried blood, beef meal, and so on. All these are by-products from the packing houses. Dried bood and beef meal, which is the blood that has been dried, are rich in protein. The greatest objection is that they are too high in price, 2½ to 3 cents per pound. At 1½ to 1¾ cents per pound they might be fed to advantage, but they are too high at the present time.

We have on this chart the different kinds of hay. Timothy hay is something which is grown quite largely throughout the country and is exceptionally good for horse feeding, but not for dairy cattle. It is lacking in protein. Ten pounds more of the black and yellow material for every pound of red in it than it should have. Prairie hay is much better than timothy hay.

We have here alfalfa. Alfalfa contains 11 per cent protein; 39.6 per cent carbohydrates, 1.2 per cent fat. The nutritive ration is 1-3-8. In any section of the country where alfalfa can be grown it is the best feed for dairymen; a ration of alfalfa and corn will give you a balanced ration, one of the cheapest rations, and it can be grown on the farm. In the districts where alfalfa can be grown it is one of the best things and one that the farmers in that vicinity should grow.

Clover hay comes next; its nutritive ration is 1-5-8.

We have here rape and blue grass pasture. Rape is something which can not be fed dairy cows, as it will taint milk.

Cottonseed meal is richest in protein, richer than gluten feed or oil meal and good feed for dairy cattle when it can be purchased cheaper, and generally speaking it is a cheap feed.

We have flaxseed meal here from which the oil meal is made. It is fairly rich in protein but especially rich in bran. It can not be fed with profit to dairy cows, but is exceptionally good to add to skim milk for calves—mix flaxseed meal and skim milk for calves. A great many people take one part flaxseed meal and six parts water and soak it seven or eight hours and boil it an hour, until it gets into a thick mush.

We have here germ oil meal. This feed has been advertised quite extensively but in our experience has not proven nearly as satisfactory as gluten feed or gluten meal.

You will notice from the very beginning we have emphasized especially the importance of having a large amount of protein present. That is for the feed which is consumed for the purpose of the production of milk. We are often asked the question, "What is the value of this kind of feed in feeding cows?" Bran is worth, say, $15 per ton now, and oats, when compared to bran at that price, is much cheaper for the dairy farmer to feed . In order to work out a chart on that line I have the following figures. This is a chart gotten up simply to show the protein value of different feed stuffs. I don't want you to understand for a moment that this chart gives the actual value of the feed stuffs. The feed stuffs on this chart are represented as having low values are high in carbohydrates cr fat. This gives protein value. On every farm there is plenty of carbohydrates and fats grown and one constituent which is lacking is protein, and this chart gives the protein value not the exact value, but the protein value, and is based on the following basis. When bran is worth the following prices per ton other feeds are worth these prices:

What is the price of bran (Answer—$20, $18, $14). Well, we will say $16. When bran is worth $16 per ton on a protein basis shorts are worth $16; gluten feed, $32; corn bran, $9.47; oil meal, old process, $37; new process, $36; cottonseed meal, $47.61; flaxseed meal, $26.36; germ oil meal, $26.88; clover hay, $8.70; timothy hay, $3.58 (That looks low, and it is a low value for timothy hay, but timothy hay is low in protein and not a good feed for dairy cattle and is not worth one half as much as clover hay); prairie hay, $4.48; corn fodder, $3.20; alfalfa is worth $14 per ton when bran is worth $16 from a protein standpoint;

corn, 28 cents per bushel; corn cob meal, 16.8 cents per bushel; oats, 18 cents per bushel from a protein standpoint when bran is worth $16 per ton; wheat, 39 cents a bushel; rye, 35 cents a bushel; barley, 26 cents. Beef meal about $71 per ton; dried blood, in skim milk, 18½ cents per hundred-weight and palm meal 24.9 cents per hundred-weight. Feeds which are placed here at a low value are valuable for other things; corn is not valuable for the amount of protein it contains but is valuable as a fattening feed; the same thing is true of timothy. So those things may be valuable for other things, but on the average farm there is an abundance of carbohydrates and what we lack is protein, and the question is "How can I purchase protein cheapest?" This chart is to show you the value of the different subjects.

I have gone over this subject hurriedly, but the time is limited, and I thank you for the attention you have given me. (Applause.)

DISCUSSION.

Question: Professor, do you consider it wise in feeding corn, to balance corn ration with gluten meal? Or would it be better with wheat bran?

Answer: No, it will depend on the price of feed stuffs. We are feeding corn and gluten feed because we can get gluten feed for $18.50 a ton delivered in Ames, and that is cheaper than bran. It would be as cheap as bran at $9.

Question: Gluten feed is a part of corn, then is it as good as some other feed?

Answer: That is not the point at all. Corn grown upon the farm does not contain enough protein. It contains an abundance of starch and fat. The glucose man buys the corn and it is broken up for the carbohdrates, and he takes out that part the farmer does not want. It would not make any difference in that respect at all, but we find the cattle eat gluten feed and corn just as well as wheat bran and corn. We get as good results and much cheaper. We do feed a little, more or less wheat bran all the time. We keep a little on hand not because it is cheap, but it is an appetizer; but I think under present prices it would be much more economical to feed gluten feed and corn than wheat bran and corn. At the present prices gluten feed is $6 or $7 cheaper than wheat bran.

THE ADVANTAGES OF A SILO TO THE IOWA DAIRYMAN.

A. W. Mowbray, St. Charles Minnesota.

Mr. President, Ladies and Gentlemen: It affords me great pleasure to meet with you on this occasion. Although the greater part of my life has been spent within sixty miles of your northern line, I have never before been within the borders of your State. Some weeks ago I received a letter from my old-time friend—your secretary—asking me to read a paper at your annual meeting, on the subject, "The Advantage of the Silo to the Dairyman." Why he should have assigned to me this very important subject I can not understand, unless it be that by some means he learned that up in Minnesota I am dubbed the silo crank, and thought possibly I might have a few ideas along this line.

The silo in some form of construction has been in use for hundreds of years in various parts of the old world; while only little more than a quarter of a century has elapsed since its first introduction in the United States. Naturally its adoption was somewhat slow at first, but at the preent time silos are in use in every State of the Union.

The number of silos would not have increased so rapidly in the last few years had it not been clearly demonstrated that by no other means was it possible to store so large a proportion of the winter's food supply so economically.

You will all agree with me that the best, most satisfactory single feed for the dairy cow is pasture grass, and that in midsummer if pastures are short and brown no supplementary feed of which we have knowledge will give us so good results as green corn. This being the case, it naturally follows that corn is pre-eminently the plant to be used for silage.

On good soil, well fertilized, we can produce an average of fourteen tons of green corn per acre—28,000 pounds. Professor Haecker of the Minnesota station, from the analysis of many samples of silage, draws the conclusion that the average protein content is not less than two per cent. That being true, in one acre of corn—or 28,000 pounds—we have five hundred and sixty pounds of protein.

To incorporate sufficient protein in the ration for our dairy cows to enable them to do their best work, is the problem ever before the dairymen; but if we are feeding thirty pounds a day of good silage the cow derives from that alone one third the amount of protein necessary for very satisfactory dairy work. But simply the protein content of corn silage is not the only advantage we gain. As in pasture grass the cow finds something in corn silage that enables her to produce milk and butter fat more economically than she can possibly do on any combination of dry feeds entirely.

It is not entirely the high price we may obtain for our dairy product that marks our measure of success but the low price from which it can be produced as well.

If we feed a ration of thirty pounds of silage, twelve pounds of clover hay and five pounds of corn meal, the average cost for a series of years will not be more than nine cents per day, and still the ration is sufficient to maintain the cow in normal flesh while doing better than average dairy work.

Until the advent of the silo dairymen have been forced to part with much good coin in exchange for feeds rich in protein, as without them it has been found impossible to obtain a satisfactory flow of milk; with the silo this is all changed. It is entirely possible for our cows to do good dairy work if they have silage clover hay, corn or barley meal in the proper proportion, and the money that formerly went for commercial feeds can be placed where it will give greater satisfaction.

At home we have kept a dairy of twenty cows the past year without an acre of pasture. Until July fifteenth the cows were given a large yard and fed on corn silage, clover hay and wheat bran. The bran was used because our corn crop last year was a total failure. July fifteenth they were given the run of a thirty-acre meadow from which we had cut a heavy crop of June and Alsike clover and timothy. This is the first year we have tried the plan, and I am glad to be able to say it has proven entirely satisfactory. We can not afford to devote good tillable land, worth sixty dollars per acre, to pasture when, by a little more work, the cows can be fed and the entire farm cropped. Without the aid of the silo this method could not be successfully adopted.

A silo sixteen feet in diameter and thirty feet high will hold one hundred and thirty tons of corn, or the crop of nine acres. In this amount we have approximately five thousand pounds of protein as much as is found in thirty tons of good clover hay, or the product of possibly twelve acres; or as much as is contained in fifty tons of timothy hay, twenty-five acres of an average crop. Thus it will be seen that in one acre of corn silage we have as much protein as in one and one third acres of clover hay or in two and seven ninths acres of timothy hay.

It has been quite generally conceded for years that clover hay is the most desirable roughage the dairyman could produce, but experiment has demonstrated that corn silage will furnish cheaper protein, beside the advantage of the succulent nature of the feed, thus giving our cows a ration closely resembling that of the summer season.

If we provide our cows with warm barns, warm water and corn silage as a part of their daily ration, other things being equal, we may reasonably expect them to do better work in the winter than in the summer months. Then again it will be remembered that the winter market for butter is 30 to 60 per cent better than the summer market. We can in this way do the greater part of our dairy work in the winter season, when the higher prices prevail and our time is not so fully occupied with field work as is the case during the summer season.

As a supplement to pasture grass there is nothing that will give as satisfactory results as corn silage. It can be used the entire summer and the carrying capacity of the farm greatly increased. No matter how busy we may be, or how inclement the weather, the necessary feed is always at hand, and the cows are not necessarily subjected to a few days of insufficient feed, with a proportionate shrinkage in the milk yield.

Then to sum up the advantages of a silo to the dairyman, we find these:

1. The production of more and cheaper protein per acre than by any other means that has been demonstrated as practical.

2. The ability to give our cows a succulent food, during the winter months, closely resembling June pasture.

3. The production of the bulk of our dairy products during the winter season, when we realize the best prices and have the greatest amount of time to devote to the work.

4. By the use of the silo we are enabled to store the greatest amount of feed in the least possible space.

5. The necessity of purchasing large amounts of commercial feed is largely done away with.

6. The producing capacity of the farm and the herd is increased, thus necessarily increasing the profits of this branch of our work.

7. It is the cheapest and best supplementary feed that can be provided, thus obviating the danger of too closely cropping the pasture.

These are by no means all of the advantages to be derived from the use of the silo but enough to convince the most skeptical that it fills a long felt want, and its use is a long step toward improved dairying.

Your State, like a few others in the upper Mississippi valley, has made marvelous strides in the production of dairy products during the past decade, but your possibilities in this direction have not even been dreamed of. With better cows, better care, better feed and better dairymen, the net returns of the industry in your State will be greatly enhanced.

But I beg your pardon; I am diverging. Although the subject as assigned me, "The Advantages of a Silo to the Dairyman," does not clearly give me the right, still I wish to call your attention to a few of the mistakes that the average dairyman is in danger of making when planning a silo and buying the machinery necessary to fill the same.

When planning a silo two ideas should be kept constantly in mind,—the necessity of using the entire surface at least every forty-eight hours; and the fact that the bottom five feet is worth about as much as the top ten. To illustrate—if we have a herd of twenty-five cows and desire to feed an average of thirty-three and one third pounds of silage per day for a period of three hundred days, we will need one hundred and twenty-five tons. A silo sixteen feet in diameter and thirty-two feet high has a capacity of one hundred and twenty-eight tons, the required amount, and will give much better satisfaction than will one of greater diameter and less height. I have seen in Minnesota a silo twenty-four feet in diameter and twenty-four feet high. the first one built in my home county. While this silo will store a large amount of feed, still it is by no means satisfactory to its owner. owing to the large surface exposed to the air. With greater height and smaller diameter the pressure would be greater, expelling the air more completely and resulting in a better quality of silage.

A safe rule is this, the height should be twice the diameter.

But a silo without the necessary machinery to fill it is of no more value than a church without a preacher. There are comparatively few days when corn is in just the proper stage to make the best silage. hence it is of the utmost importance that we be provided with good machinery and have everything in perfect order. If a carrier is used it should be put in place long before the binder is in the field and loaded teams are at hand. If a pneumatic carrier or blower is used you should know that it will elevate to the height desired without causing delay. No greater annoyance comes to the dairyman than unnecessary delay at the time of filling the silos.

After five years' experience with the silo I am fully convinced that there is no single adjunct that the dairyman can adopt from which he will derive the advantages obtained by the use of the silo.

THE PRESIDENT: I would like to have this whole subject discussed and would be glad to have you ask Mr. Mowbray as many questions as you desire. It is a subject of great importance and one that will claim your attention from this time forward.

DISCUSSION.

MR. OLSON: I would like to ask the gentleman if he fills his silo from the top and if he takes out stuff from the top?

Answer: We fill it from the top and we take it out from the top. Our silo is built thirty by sixteen feet and stands about two and a half feet from the barn. The barn stands here and the silo is here (illustrates with model). The machinery stands off here; we have five doors on this side.

MR. OLSON: Will silage freeze?

Answer: It will freeze a little around the edge but we always keep a pickaxe in our silo and keep it perfectly level on top. Take off the entire surface every day, or at least every two days, in cold weather.

Question: Is Your silo round or square?

Answer: It is round.

Question: Hoops around it?

Answer: Yes, hoops around it. We have fourteen hoops around. Our silo is thirty feet high.

MR. TAYLOR: How are your joints?

Answer: This illustrates exactly the way in which our staves are spliced. That is fourteen and sixteen feet two by four.

The saw cut in the end of two or three and a piece of galvanized iron, and they are put in in that way. It is simply to keep them from turning. When your silage is in there the pressure is so great that it would be rather tight without them, in all probability; but we put these in there and never have had any trouble with the silo, and have used it for five years.

MR. TAYLOR: How is your other joining made?

Answer: Two by six. When they are put up they are a little tighter, but the difference is very little.

MR. TAYLOR: I have heard it said that the joints should be perfectly tight.

Answer: At filling time, if you stood outside of our silo you would think it would never hold silage in the world. You can see through it in every direction; but twenty-four hours after the corn is in there it is as tight as a bottle and we have never lost a bushel of silage with that kind of silo.

MR. TAYLOR: Some men have suggested that it be lined with paper, and all that.

Answer: That is true; some people may have money to burn and if they want to use it that way they may; but we have demonstrated to our satisfaction that we can keep silage perfectly in the cheapest kind of silo. Our silo, sixteen by thirty feet, built five years ago, cost us $140, roof and everything else.

MR. CARPENTER: After you take the ensilage out, will it shrink?

Answer: It will shrink and I believe that is no detriment, for this reason—to save that timber and keep it from decaying, the sooner it is perfectly dry the better and if it shrinks and the air passes between the boards the drier it gets and the longer it will last. Our has been in use for five years and, as I have stated before, I have not yet seen a particle of decay.

MR. CARPENTER: You say the silo is east of the barn?

Answer: No, at the south end of the barn. I would recommend that you put your silo at the south end. The north and west winds in Minnesota, and probably in Iowa, are cold and you will have less trouble with freezing on the south side, if practicable to put it there.

Mr. Taylor: What prevents it from falling down in summer time?

Answer: We stall it with two small wire ropes from each corner of the barn. Our barn stands here (illustrates) and from the corner of the barn here is your wire rope. That is all the support. It has a good solid roof and I think the roof goes a good way towards holding it in shape. You will notice here there are four posts, six by six, one at each corner, and the roof stands on these four posts and that holds it firmly, although I have seen in the summer, during a strong wind, our silo shake a little, but still I have never been frightened for it.

Question: Have you solid bottom in that silo?

Answer: If you are going to build a silo, the foundation is the most important. If you want your silo sixteen feet build your foundation at least seventeen or seventeen and a half feet; go into the ground far enough so you will feel that it is solid and firm; build your wall on the outside a good strong, solid wall; in the center you can lay anything in the way of rough stone, but towards the top break them up and make them small; at the top if you have coarse gravel, put a coating of that over it so the spaces are well filled, then put on your cement and it should be almost like one solid stone. The foundation is very important.

By some means or other, the rats got into our silo last winter, the first time we ever had any trouble in that way, and we lost more silage last winter than we ever had before until we discovered the cause—simply the rats got in there and let the air in.

Mr. Cobb: If you had a six-inch jog in your wall, about eight inches down, you would never have had any trouble with rats. Say the foundation is twelve or fourteen inches and your trench twenty inches. Then jog in from the outside six or seven inches; go up another foot. I never saw a rat in the world come in on that jog.

Answer: That is quite a scheme; it's all right.

Mr. Carpenter: It seems the men who have remained here are much interested in this subject and I believe we could spend a little more time on it very profitably.

I am a thorough advocate of the silo and I have used one for years on a farm in Minnesota. I understood the gentleman to say he could feed a cow much cheaper from a silo in the summer than on a pasture. I wish, if he said that, he would emphasize it a little stronger and get these farmers to believe that it is so and stop pasturing cows on land worth $100 per acre.

Answer: I said exactly what I am accused of. I said you could feed a cow more economically on silage than you can on pasture. If land is worth five or ten dollars an acre we can afford to pasture it, but when it is worth sixty, eighty or one hundred dollars an acre we can not afford to devote that land to pasture entirely. Now, we kept our cows last year on ensilage until after we had taken off a heavy crop of hay; about the 15th of July we got a second crop, otherwise we would not have cut it; but two or three months' pasture that we get off that cost us that second crop. Silage, good corn silage, will save the farmers of Iowa hundreds of thousands of dollars by allowing them to crop their acres and feed their cows with something just as good as pasture grass.

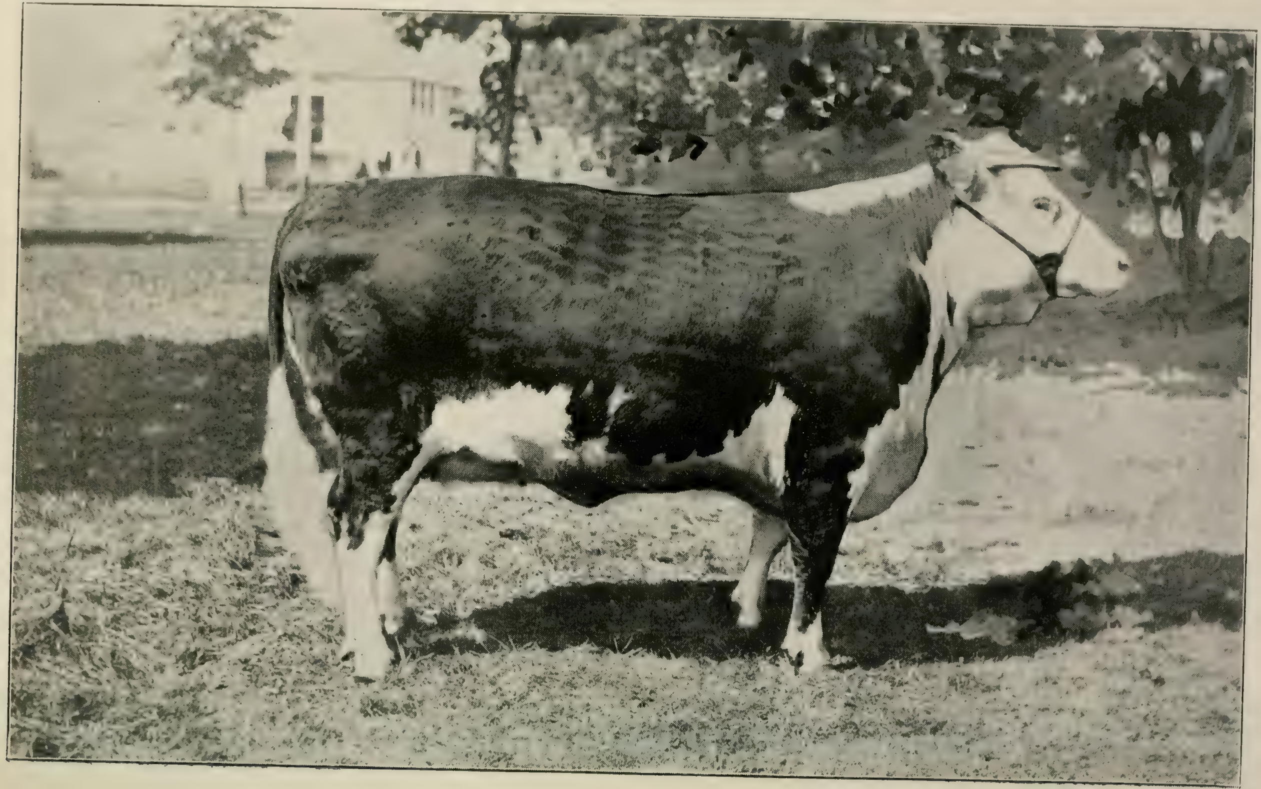
Mr. Taylor: How are you going to maintain the fertility of the farm?

Answer: You can not afford to haul fertilizer from your barn any great distance; we simply had to do it to get it out of the way. You can purchase your fertilizer much cheaper.

Question: Why will a cow give the most milk and make the most butter on pasture?

Answer: You will all agree with me that there is not a single food that is better than pasture grass, but a cow will do equally as good work and will make you more net money in the twelve months if you have her freshened in the fall and use corn silage, than she will by freshening in the spring and putting her on pasture.

Mr. Goodrich: I think, before the Iowa farmer can be brought to put in a silo, he has to be educated up to the point of putting in a silo to store his corn crop instead of letting the winter winds blow it away. I believe the corn crop to almost fifty per cent of the farmers of northwestern Iowa is almost a total loss. A man turns his cows into the corn field and they do well on it for a few days, but that is all.



Prize winning Hereford, Iowa State Fair, 1903.

Answer: That is very true. When we remember that about half of the value of the corn planted is in the fodder, only about half of it in the grain, just think for a moment what we are losing when we let that stand in the field. There is a very small proportion of it utilized by the cattle, and it is in such condition that it gives very poor results indeed. There is no doubt in my mind but the farmers of Iowa will reap much better results, their net profits will be better and they will be encouraged in their occupation, when they adopt the use of the silo more extensively.

I am somewhat surprised, and perhaps I will be pardoned if I say pleased, when I am told since coming to your State, that from the State of Minnesota the farmers are learning the value of the silo. Now we in Minnesota came down here to northern Iowa to learn the value of co-operative creameries. We took the thought home with us and adopted it, and we have changed our financial condition very materially. Now then, if we can return the compliment and give you thoughts along the use of the silo, I at least am very glad indeed; I am also very glad to be able to say that the silos of my own country have increased two hundred per cent during the past year. While three years ago, five years ago, there were but two silos in the county today there are fifteen. I know of perhaps fifteen farmers in my own neighborhood who will build silos next year, simply by having seen the results of the silo on our farm.

Question: What is the cost of machinery to fill silos and what machine is used for that purpose?

Answer: There are many kinds of silage and machinery. We have used at home three different machines, and with the first one we were very much dissatisfied; it was constantly breaking and getting out of repair,—a source of annoyance. When you are filling silos everything must run smoothly. The second machine was just a little better than the first, but far from perfect. A year ago last fall we bought the third machine and I am free to say that is has given us perfect satisfaction. We have used it two years without one cent of expense or a moment's delay, and you can not ask anything better. That is the machine made by the Warsaw-Williams Co., of Warsaw, N. Y. I do not want to be understood to say that is the best; there may be others just as good, but that is what we are using and find it perfectly satisfactory.

MR. TAYLOR: What is the expense of the machine?

Answer: Retail price $190, but they guarantee they will put twenty tons of corn an hour into a silo thirty feet high with twelve horse-power. They make a smaller size machine but the price of it I can not tell you.

Question: How many horse-power?

Answer: Twelve horse-power.

Question: How many teams would that require?

Answer: It depends altogether on how far you have to haul it. We have the field where we raise the corn for silage right close to the barn. We have twenty acres there, and one year put one half in corn and the other half in some small grain. In that way we have ten acres, use what we want for the silo, cut the rest and feed it dry. Last year we used sixteen acres, but mind you we never ran that machine, or at least only a few moments at a time to the height of its capacity, simply because it is almost impossible to get the corn into the machine unless your men are experts. It takes practice to get twenty tons of corn an hour into a machine, but it can be done.

Question: Cut the corn with a corn cutter?

Answer: Yes. We always start our corn binder the day before we commence to fill the silo.

Question: What stage is the corn in?

Answer: A few years ago they thought the greener the corn was put in the better; but experience has demonstrated that the nearer maturity you can put it in the better silage you will get, the less acidity will develop.

MR. CARPENTER: You do not mean until the corn gets dry and hard?

Answer: No, just so it is a little damp.

Question: Dou you advise to fill your silo as soon as possible, that is, I mean would you fill it as quickly as you could?

Answer: This year we began at noon; it rained all the forenoon. We began at noon and finished the next day by noon.

We moved our machine and engine about nine miles that afternoon and filled two silos for friends of ours. They had built silos hurriedly because their corn crop was threatened to be in such shape that it would not mature. Then we came home and two or three days after that, perhaps a week after we first filled it, we finished ours and filled it, within two and a half feet of the top.

We had an experience with frosted corn one year. The machine we bought was delayed in coming to us and before we could cut our corn we had a heavy frost. We took a water-tank along beside the cutter and ran a small stream of water into the cutter all the time; we put that into the silo and never had better silage than that year. If your corn becomes frosted do not be discouraged; if you put a sufficient amount of water with it you will get a sufficient amount of silage.

Question: How deep could the silo be run?

Answer: Our silo is about one foot above the ground. There is this advantage,—if you put your silo down you will have to raise your silage out. You might a good deal better build it a few feet higher than raise it by main strength.

FOOD VALUE OF FEED STUFFS.

Euclid N. Cobb, Mammouth, Illinois.

The subject assigned to me by your secretary is one that I have given more study than any other phase of the dairy subject and I am free to say that as dairymen we have no subject that is of more vital importance to us to the profitable conducting of our business than the one of the value of the feeds we give our cows to make them live up to their possibilities as dairy animals. Our greatest source of profit lies in the production of as much feed as possible on our own farms, and briefly I will enumerate the feeds that I have found most profitable to produce; first let me say that the condition in which the feed is given to the cow is a great factor in the results obtained. I have found that at no time is a farm raised feed so profitable and palatable as it is in its green stage; so it stands us in hand to have our feed in this condition as much of the year as possible; and I have found it both practical and profitable to have the feeds in this condition the entire year, that is some of them.

In order to do this we must have our soil crops and silos as well; and so arrange the pastures and soil crops that our cows have a liberal daily allowance from early spring to late in the fall, regardless of drouths. After some years of experimenting I have settled down to the following rotation to insure the cows their green feed in ample quantity: About the 15th of May we turn our cows on grass, not stopping their feed of grain or silage at the barn at the milking hour, this is a mistake made by a large number of dairymen, and should be avoided . A cow that has been fed a liberal ration of grain in the barn is in a poor condition to go to grass and at once get the amount of nutrients necessary to make her yield the same flow of milk she did on the grain and other feeds she was receiving at the barn. She will not consume enough of the grass that is in the early spring immature, to get the amount of nutrients she requires, hence the necessity of giving her a feed at the barn for a time at least, and it is yet an open question whether she should not receive some grain every day she is at pasture. In my own case this is the first year I have conducted a herd of dairy cattle and not fed grain the whole summer through and at a profit in every case. This summer, with the greatest growth of white clover I ever saw and good fall pastures of blue grass, I have not fed any grain, but am not in a position to say it would not have paid to have fed some.

As our pastures are liable to be cut short by dry weather and the blue grass becomes tough and unpalatable, we must make provision for furnishing the cows some green thing to take the place of the pasture grass; I have followed the following plan with good results: In the spring as early as the land can be worked, I fit a piece of land for rape by dressing it well with manure, then plowing about four inches deep and harrowing finely, then sowing about four pounds of Dwarf Essex rape to the acre, harrowing again lightly. This crop will be fit to feed in about eight weeks from sowing if weather is at all favorable. Care must be used in feeding it to milk cows, or tainted milk will result. It should be cut and fed in stable or on the grass, or the cows may be turned on it after being milked, leaving them on it for two or three hours; a longer period will result in the milk being tainted. This crop is one of the greatest producers of green feed we have. One acre has been known to produce as high as twenty-five tons; it is a very profitable feed for swine also, and you will not make any mistake in sowing a field of it next year.

After I have sown the rape crop I then sow a crop of Canada peas with oats. This is a crop that will make you a splendid hay in case you do not require it for soiling purposes. It yields well and is relished by all farm animals. To sow this crop, select a piece of land that made you a good corn crop last year, sow on the ground, before plowing, about a bushel of the peas, then plow them under four inches deep, after which sow a bushel and a peck of oats on the land and harrow them in. This crop will be ready to cut for green feed about June 15th, and for hay on the 1st to the 5th of July. As a soil crop it will yield eight to twelve tons per acre and from two to four tons of hay.

The oat crop as sown on our farms makes a good green feed and comes in about the 25th of June and continues to be fit for soiling up to the 10th of July. Some of the large varieties of sweet corn are now ready for planting, and if we fit our land well we will get a great amount of green feed from the crop, and the returns in milk yield will pay well for the trouble expended. This crop will come in just after the above named crops have been rendered unfit for feed from becoming too ripe. In feeding this soil crop I have found the best plan is to feed it in the pastures, hauling it out once or twice per day as required. In feeding, begin on one side of the pasture, spreading it out so that the cows will all get a share, and the feed be kept clean. Feed each day with method, that is, spread each day's feed in a new place, so as to accomplish two objects, namely: To keep the feed clean and also to spread the resulting manure evenly over the pasture.

After the sweet and field corn crops have been planted we then plant a good sized field of sorghum, both for soiling and other uses. The yield of sorghum being much greater than corn, it will pay anyone well to have some every year, whether he is a dairyman or feeding other kinds of stock. It is relished by horses, steers and hogs alike, and in the silo is a good feed. The Tennessee experiment station reports better results from feeding sorghum silage to steers than in feeding silage made from corn. In planting sorghum, to insure harvesting it easily, I advise planting in drills. My method is to plant with a corn planter, using the small plates, a set of plates that will plant one grain of corn will drop ten pounds of sorghum per acre, which is enough on good land. It should be planted thick enough to keep the stalks from growing too large and in cultivating this crop I have found the weeder the best tool for the early stages of growth, in fact it could be used to the exclusion of any other tool. In 1902 we raised ten acres that produced twenty-two tons per acre and was only worked once with a cultivator, the weeder did the rest.

As a soil crop for all kinds of farm animals sorghum ranks among the best and when it becomes fit to feed it will keep in a green stage up to freezing weather; this quality is of value to those who have silos, as it gives them a longer period in which to fill them with a crop with the right amount of moisture and in case one has some corn that has become too dry he can mix it with the sorghum in the proportion necessary to make the silage keep well.

I have now covered the period between early pastures and winter feeding period. I have shown how I provide my stock with ample green feeds throughout the summer season, and in concluding the subject of this summer period I will say that the value of all the feeds named is governed to a great extent by the environments of the animal that receives it. A cow will not return a profit on the feeds if she is subjected to the torture of flies, and in this matter or flies, let me say that I have tested the results of flies or no flies a great many times in the past fifteen years, and have found that the loss represented full 33 1-3 per cent, which is more than any dairyman can afford to lose. We not only lose the immediate product, but in the case of young cows lose the growth as well, and with mature cows they lose a great amount of weight that they will consume food to replace after the flies are gone.

Another source of loss is in the water supply not being ample. Still another loss and one not often considered is irregular milking. It is so easy for a farmer in the busy season, to put off his milking for a half hour. so as to finish a piece of work he has in hand. With his heavy milkers he will have a loss of 10 to 20 per cent and the entire herd will shrink, and if this irregular milking is continued as a habit the herd will not yield the profit they otherwise would if system was used. So that to sum up, it is as much the care as the feed as to the profit derived from feeds consumed.

I have now presented to you the possibilities of liberal summer feeding. I will now take up the subject of winter feeding. As I have before stated. we can have green feeds 365 days in the year if we so desire, and the farmer who does not have them for his stock, from his steers down to his chickens, is a good way in the rear of the band wagon, and should get a move on himself and be abreast with the most advanced of his brother farmers. who have made provision for green. succulent feeds right through the winter months. In my boyhood days I was very fortunate in having a father who was always studying his business and who looked on farming as a profession that required as much gray matter as any of the recognized professions (at that time farming was not classed as a profession). He early learned that to carry a herd of cows through the long winters of Wisconsin, it took something more than dry hay and grain to make dairying profitable; he recognized the advantages of succulent feeds but having no silo, and at that time never having heard of one, he had to get his succulent feeds from other sources. He found this in roots; beets, turnips and carrots were the crops we raised for the cows, and at that time we were well satisfied with the results. At the present time we can get the succulent properties in feeds much cheaper than in growing roots, that is for a number of cattle. If I were to live in town and only wished to keep one or two cows, I would still depend upon the root crop for succulence, as there are but few who keep a cow in town but what have enough ground to produce enough roots to keep their cow well during the winter. But to return to the subject as it affects the dairymen at large, let me urge the necessity of having silos; you can not reach the highest success in your dairy unless you have an abundace of ensilage, not only during the winter months, but during the summer ones as well. Let me illustrate the latter proposition with some figures that we obtained during the year of 1901, when our cows had no grass from the 1st of July to the 28th of May, 1902.

When the last feed of our soiling crops are fed in the fall, how fortunate we should feel to know that our cows and all other farm animals will continue to receive green feed and not be subjected to the shrink in both milk yield and bodily weight as well. as in the case of animals that are put on dry feed. Not only will our animals continue to give us the same results as they were in being fed the soil crops, but we will make the change without increasing the cost of the daily rations. I have found that my ensilage is the cheapest feed that I produce on the farm. To illustrate, let me give the amount of feed in days and weeks that an acre of corn in the silo represents. I am making these statements after using ensilage for the past seventeen years. This fall I went through our corn field and cut representative hills enough to get a fair average and found that the yield exceeded nineteen tons per acre. Now as it requires from thirty-five to forty pounds of ensilage to feed a cow daily, we have a yield in the field sufficient to feed a cow thirty-six months. In the case of our sorghum last year, it represented a feeding value of forty-four months, and this year, with a poor stand, we have a food value of thirty months per acre. These figures are startling to the average farmer who has been in the habit of saving his fodder in the old way, or not saving it at all, as I see a great many are doing in this State. In connection with the food value of an acre of corn, let us see how it compares with an acre of our blue grass pastures. I find that one can not depend upon pastures to furnish a liberal feed throughout the season, but admiting it will, we can not safely put more than one mature animal on an acre which means that for six months an acre will sustain one animal, while our acre of corn in the silo will feed the same animal from five to six times as long.

We have now devoted as much space as we are entitled to in presenting the advantages of green feeds, so will turn our attention to the grains and by-products that are being extensively advertised by stockmen and dairymen.

The farmer who buys these feeds that are advertised notices that the advertiser puts especial stress on the protein content of his feed. This is due to the fact that the lacking element in farm grown grains is this nutrient, so that the former is obliged to supply it outside of his own farm crops, and he soon finds that most of the feeds that are rich in protein, are high in price as well, and from the viewpoint of cost of actual protein content. I wish to discuss these feeds briefly: First, let me say that the man who feeds his stock a balanced ration, no matter what kind of stock it may be, he is the man who is making the most money, and the different feeds that I will speak of are the ones I have found the best to make the balance for the stock in connection with the green and dry feeds that we grow and feed on our farms. We can grow all of the fat forming feeds we require much cheaper than we can buy them, but the element that promotes growth and milk is lacking in all that we produce outside of the clovers, peas and oats, so to know how and what to buy will be a help to us all. A striking example of the subject is the cost of the protein content in corn. Corn contains but 7.9 pounds of protein in 100 pounds, so that in paying 70 cents per hundred for corn, we pay 6.8 cents for every pound of protein it contains.

I will now give the names of the different feeds that I have found valuable to use in both the dairy herd, fattening lot and hog pens, and as I mention them will give the cost per pound of the protein they contain. The first on the list is Atlas Gluten Meal, a by-product of distilleries. It is composed of rye, corn and rice, and contains 24 per cent of protein, and at the price of $1.25 per hundred weight, the protein costs us 5 cents per pound. Gluten Meal is another feed that is becoming quite popular, both for the dairymen, stockmen and swine feeder. This feed now costs us $1.25 per hundred weight and has a protein content of 32 per cent, or a cost of 4 cents per pound for the protein it contains.

Gluten feed, another by-product of the corn syrup factory, is one we must buy with a great deal of confidence in our dealer's honesty, for it admits of being adulterated, and is not a feed that I would recommend where the meal can be had, which is of such a nature that adulteration may be readily detected. Good gluten feed is composed of gluten meal and the finer parts of the corn bran. Its only virtue is in its being more bulky than the meal. The protein content ranges from 23 per cent to as low as 15 per cent, and the cost of protein content is about 5 cents.

Cottonseed meal is the cheapest source of protein we have offered to us, but unfortunately the feed is one that requires skill to feed it; if not, the results in either the dairy or beef herd is against its use, but the only precaution is in feeding it in small quantities. In the case of feeding in open bunks where cattle are allowed free access to the feed at all times some of them are liable to get more than is good for them, and in the dairy herd over feeding often results in abortion, but if fed in moderation it is a valuauble feed and one that I keep in our barn at all times of the year. It is astringent in its effect, so goes well with ensilage or the soiling crops I have named that are somewhat laxative. It causes the butter product of our cows to stand up well in the warm months as it raises the melting point five degrees. This feed carries an average of 37 per cent of protein and the protein costs us 3 1-3 cents per pound at the present price of the meal.

Oil Meal O. P. is a good feed for the farmer who does not feed ensilage, but where ensilage is fed it does not do well, as it is laxative in its nature the same as is ensilage, the result is the cattle are kept in a state of looseness, not at all pleasant for the attendant. For feeding in connection with dry feeds it is invaluable and should be used by all who do not practice green feeding during the winter months. The protein content of this feed is 29 per cent and the cost per pound is 5 cents. Bran is a feed that has been at a price for some years that is prohibitive as far as any profit from feeding it goes. I account for this in the fact that it was our first source of protein when the balanced ration was first given to the dairyman, and but few have posted themselves on the new feeds, so continue to buy bran regardless of price asked. The cost of a pound of protein in bran is now 7 cents.

Oats, the only protein feed the farmer raises as gain, is the dearest source of protein that I will name. The cost of a pound is 10 3-4 cents, or a price that admits of no profit when we consider it in connection with the cost of protein in some of the feeds above named.

I have now covered the ground that I wished to, and as the banker would say, will give a recapitulation from a personal experience of practicing what I preach. My knowledge and practice of feeds and feeding them has enabled me to make dairying and stock raising profitable enough to rear a family of ten children, educating them at home as far as agricultural knowledge is concerned. They have been taught responsibility, thrift, industry and a love for farm life that does not admit of their ever looking on their lot as one of drudgery, as in the case of so many of our farm-reared boys and girls. My sons, three of them, have reached manhood with records of good habits, that I am very proud of. They have never stepped inside of a saloon door, used tobacco in any form, or contracted any habits that are calculated to make them spend money foolishly. One of these boys is now a citizen of this state, holding a responsible position with a large milk dealer of Burlington.

DISCUSSION.

Question: Do you feed all cottonseed?

Answer: Yes, sir.

Question: Does a cow take to this cottonseed meal?

Question: Cottonseed meal, fed with any other grain, sticks to their gums. It is disagreeable to them, while perhaps it is palatable, it is disagreeable, and should be mixed either with silage or with other grain to obviate the stickiness.

Question: Are there any injurious effects from feeding cottonseed meal?

Answer: Yes; if you feed too much of it. The only drawback is when some careless person feeds too much. Three pounds is plenty to feed any ordinary dairy cow.

Question: How do you advise planting corn for silage, thick or thin?

Answer: My rule is plant a bushel in five acres.

Question: That is about one third thicker than you would naturally follow?

Answer: Yes, sir.

Question: Speaking of rape for dairy cows, a friend of mine stated a couple of days ago that he lost six of his best cows this Fall from turning them into a rape field.

Answer: Well, he turned those cows in hungry. The cows were hungry for something green and the result was inevitable, just the same as though he turned hungry cows into a clover field that had dew on it.

Question: When is the best time to turn the cows into a rape field?

Answer: After the milking hour, in the morning, if you can turn them in an hour and a half or two hours, that is long enough. The rape is so easily gathered that they fill themselves sufficiently in that length of time.

Question: How about the rape tainting the milk? It is considered that it is eight hours before the odors of any of those feeds disappear?

Answer: It is not so much taking it into the stomach as coming in contact with it. That is where the taint comes. You may feed rape or anything of that kind in the manger where the cow udders do not come into contact with it. It is the contact that makes the trouble.

Question: Do you think your system of silage is sufficient for feeding the entire season through?

Answer: No; I do not. I never was fortunate enough to have ensilage enough to run through the summer. It is cheaper if you have silo capacity.

Question: Why do the condensaries object to milk that is obtained from cows eating ensilage, and how would you obviate the trouble?

Answer: Condensaries object from this one point—twenty men take milk to a condensary; nineteen of them are perfectly cleanly and particular and have first-class silos. The twentieth man is a sort of slovenly fellow and his silo was put up in a bad way, he has it full of poor ensilage, and so his one silo and his one bunch of cows will affect the whole product, and to insure themselves against anything of that kind they just bar out the nineteen men because of this tewentieth man's carelessness.

I just want to say, I do not know as anybody present belongs to my correspondence school. This Fall I answered sixty-one letters, twenty-one from Iowa,—and those twenty-one from Iowa were all about silos, fourteen of the twenty-one were from beef men. I will say regarding this school, you are all perfectly free to write me in regard to any of the subjects with which I am familiar, but do not forget the stamp; and I will further say that those of you who have not my book, I have a few of them here and have made a special price on them for meetings of this kind. You may see me later about that.

Question: Do you think it desirable to have these silos inside a building? Don't you think it would last longer inside than when exposed to sun or air?

Answer: If you farmers were as careful about the lasting of your selfbinders and your cows and all other machinery as you are about the lasting of your silo, I don't know how long your binder and other machinery would last. The first question asked is, How long is it going to last? When a man builds a corncrib he never talks about it. Up in Henry county, Illinois, there is a silo built of three quarters inch flooring and has its fifteenth crop of ensilage in it. If three quarters inch flooring will last fifteen years in a silo, how long will 2 by 4 last? And as far as the inside of the barn is concerned, it is as this preceding gentleman has stated—after the silo is emptied the staves spring apart and the sunlight and air pass through, and that 2 by 4 is just as free from decay as though piled up in your barn. It is practically dry; no moisture can stay on these 2 by 4s.

Question: Do you paint them?

Answer: Paint them with cold tar. No other paint will withstand the acid produced in the silage. No paint will withstand it. Just ordinary gas tar will cost you three or four dollars a barrel. It is the best preservative for the silo that we know of.

Question: What size posts do you use?

Answer: Four by 6. You may call that a corner post, if you please, that is a corner post of the silo. You put this up before you start your silo, just the same as you would your barn, and spike it. I tell you when your silo is done you can certainly see there is no flat surface that the wind is going to get hold of, and the consequence is it is one of the strongest buildings on the farm, and the most profitable.

Question: Do you have your joints beveled?

Answer: No, sir; take the lumber as it comes from the yard; the only precaution is, see that the stick holds its width through; do not have one end wide and the other narrow.

If you desire any further information I shall be very glad to give it to you here in the hall, after the meeting, or down at my hotel.

The President: We have a session of the National Dairy Union this evening and I want to offer as an attraction that Mr. Jules Lombard will be in attendance and will sing for you. I believe you realize that the work of the National Dairy Union is something in which you should all be interested, and I hope we will have a good attendance at the meeting.

SESSION OF THE NATIONAL DAIRY UNION.

THURSDAY EVENING, NOV. 19, 1903.

Vice President S. B. Shilling in the chair.

THE CHAIRMAN: We have met this evening for the purpose of discussing the affairs of the National Dairy Union. I do not at this time deem it necessary to tell you what the National Dairy Union is, nor do I believe it necessary to stand here and tell you what it has accomplished and what it hopes to accomplish, or for what objects the association was formed.

I know that I speak advisedly to you when I say that it was the earnest wish of the officers of the National Dairy Union, when they met a year ago, to have the affairs of the organization wound up at the end of the year if possible. They believed it had lived its day of usefulness and hoped it would not be necessary to maintain the association any longer.

It has been a discouraging fight, and since I have become connected with it my greatest wonder has been that the officers of the association have not become wholly discouraged and abandoned it before this. The facts of the matter are that the existence of one of the largest industries in the United States today has been threatened and is in as critical condition as it ever has been, from the time that this fight commenced.

A short time ago we lost the president of the association, Governor Hoard. He felt that the duties connected with the office were to much for him in connection with his other duties; and I know it to be a fact that the secretary, Mr. Knight, has felt upon several occasions that were it not for the friends who have stood by him so loyally that he did not feel he could sacrifice their interests in any way, he, too, would have abandoned the field.

I have no desire, ladies and gentlemen, to paint the picture any darker than it is; I have no desire to in any way misrepresent the facts as they exist, but I do want to tell you the conditions that confront us today.

So far as the combination in opposition is concerned, I want to say to you that it is an organization with millions of money behind it and a willingness to spend it; and so far (although I have no desire in any way to find fault with what has been done, because there is a host of dairymen and creameries of the United States that have come to our rescue and contributed to the support of this movement) we have not had the money to fight our cause that the oleomargarine people have. I will make this assertion, and I believe I make no mistake, that if we had one dollar to their hundred we could follow them through the courts of the United States; we could meet every move they would make.

It has been the cry with us from the start, we have had to keep after you to get money. I am glad the meeting has been called in connection with this association, for the fact is had it been impossible for us to have had a meeting this year I fear the organization would have been forced to disband before another year.

I wish to give you freely the situation as it is at the present time and then the question will be up to you. We want an expression from you. I am sure of this fact, and that is that the officers of this association have no desire, unless it is the earnest wish (and even then I do not know whether we will be able to carry on the work or not) of the dairymen of this country, to continue the work in their behalf.

The conditions are these: A suit comes up for trial the 30th of this month, the first before the Supreme Court of the United States, in which the constitutionality of the oleomargarine law is attacked. And I want to say so far as the oleomargarine people are concerned, they are represented by the best lawyer in the United States, one acknowledged as such. He is the man who attacked the inheritance tax law and brought it to a successful issue. They have him employed and I want to place the question before you, while they have an enormous amount of money, yet if they do not hope ultimately to win, why do they employ a man like Mr. Guthrie to plead their case before the Supreme Court of the United States? That case comes up the 30th of this month.

You are aware of the fact that for five months of the past year we were absolutely helpless in preventing them from incorporating a color in their product, which baffled the skill of the best chemists the government could employ. They went undiscovered for five months, during which time their product was sold the same as before the law was enacted, until the revenue department was finally able to demonstrate for a certainty that they were using artificial coloration. Since then the government has assessed the manufacturers who produced these colored goods, and in one case $30,000 was sked for and has been paid by one firm to the government. This factory has sued the government, which is simply another way of arriving at the result they sought to attain when they endeavored to have the law declared unconstitutional. If they are successful in this suit, if they are able to recover that money from the government, the work of this organization for the past five years amounts to nothing. We are simply where we started from.

In addition to that, they have commenced a campaign in which, if they do not succeed in incorporating a color into their product, they are trying to bring butter upon the same plane as oleomargarine. If they can prevent the coloration of butter in certain states of the Union, they will have arrived in another way at the same point as where they colored their oleomargarine,—they have simply got both white and can go ahead and sell their product the same as before, without restrictions. Not only that, but they are taking advantage of technicalities. This is something that only came up last week in the state of Pennsylvania in relation to food products, which is an old law, and says that nothing shall be incorporated into a food product unless it is a part of that food product. They have gone so far as to have the law looked up with the intention of taking advantage of this,—that butter color is not a part of the product, and prevent the coloring of butter in one of the largest states we have. I simply give you this to show the desperate straits to which they are driven, to demonstrate that they will not be downed in the matter. We know this.

We also know that they have a high-priced corps of chemists at work trying to incorporate a color into their product and still evade the law; we know they have the best chemists that money can hire, and I believe, unless some unforeseen circumstances arise, that in the end they may be successful in this.

I am giving you these conditions just as they exist for this reason,—I want to show you the necessity of our not letting the organization of the National Dairy Union die. I am trying to put the matter before you, the facts indeed, just as they exist today. Not that I wish to exaggerate or in any way to unnecessarily alarm you, but I consider the most critical question before the dairy people of the United States today is the maintenance of some organization that will protect them. There is not a business today of one half the magnitude of the dairy business but has its organization, and the conditions are such today that I would regard it as a calamity (as I think you would) if we did not have some organiation to look after and perpetuate the dairy interests.

Now, I do not wish to take too much of your time just now, but probably will have an opportunity to talk before you again. I want to say to you that the secretary of the organization, the man who has been at the butt end of the gun from the inception of this fight, is with us tonight; he is here prepared to make a report to you of what has transpired in the past year, and I will leave the question now and call upon him for his report.

I have the pleasure of introducing to you Mr. Charles Y. Knight.

SECRETARY AND TREASURER'S REPORT FOR YEAR ENDING NOVEMBER 1, 1903.

Charles Y. Knight, Chicago.

Ladies and Gentlemen, Members of the Iowa Dairymen's Association and Guests of the National Dairy Union: I am here this evening not to entertain you, but to give you a little idea of the business that has been transacted by the National Dairy Union during the past year, because the National Dairy Union has in the past twelve months been compelled to go into business, as it were in order to keep alive. But before giving you any report or any insight of the workings of the organization itself during the year just ended, I desire briefly to cover the ground of the effects of the work of the organization during the past five years.

The oleomargarine makers of the United States during the govern- under the last year of the old law, when the greater amount of oleo- the commissioner of internal revenue of the treasury department, 126.315,427 pounds of oleomargarine. That was their last year under the old law wherein colored oleomargarine was taxed but two cents per pound. In the manner that butter is loaded in refrigerators, this would amount to 6,031 cars of 20.000 pounds each, or 2.506.000 tubs of fifty pounds. The average tub of butter scarcely weighs fifty pounds, but this is made fifty pounds for convenience.

During the fiscal year ending July, 1, 1903 (the first year under the new law), these same oleomargarine makers produced 71.211,244 pounds of oleomargarine, of which 68,490.800 were uncolored and 2.720.440 colored, the former paying one quarter cent tax and the latter ten cents. In car lots the production for the last fiscal year was equal to 3,550 carloads of 20,000 pounds each, or 1,424,000 tubs of fifty pounds each.

This was a decrease under the new law of 2,481 carloads, 1,082,000 fifty-pound tubs, or 44 per cent, which would load 103 trains of twenty-four cars each, in face of a market for butter which averaged under the new law one and one half cents higher for extras in creamery than under the last year of the old law, when the greater amount of oleomargarine was produced. We had a higher price for butter. In face of that higher price for butter they sold 44 per cent less oleomargarine and, as Mr. Shilling has stated, during five months of that year they had access to a secret way of coloring their oleomargarine which the government chemists failed to discover in a practical way until very late in the season.

What does this mean to the dairying public?

It would require six hundred and fifty average size creameries to produce in a year the butter necessary to take the place of the 55,000.000 pounds of oleomargarine which the ten cent tax law has displaced. This butter, at an average of twenty cents per pound, would bring the dairymen of this country $11,020,836.

So much for the value of the increased product for which a market has been made.

But in addition to this, dairymen for the first year under the new law received one and one half cents more for their butter than during the previous year under the old law The census of 1900 shows that the creameries of the country during the year produced 439.954.173 pounds of butter. An increase of one and one half cents per pound upon this product means $6,195,187 in the pockets of the patrons of the creameries alone, which, divided amoung creameries, means an average increase of $1,500 for the year in the selling price of the butter of the average creamery.

It is safe to say, however, that instead of one and one half cents per pound, as estimated, the new national law has saved the producers of milk at least three cents per pound, because the market instead of having averaged one and one half cents higher, would have averaged at least one and one cent lower as a result of continued encroachments of oleomargarine, the traffic in which increased during the fiscal year ended July 1, 1902, almost 22,000,000 pounds over the previous year. They made 126,000,000 pounds the last year under the old law; the year before, 104,000,000. They were going ahead at the rate of 25 per cent per year. The 126,000,000 pounds represented more than 25 per cent of all the product of all the creameries in the United States.

Unless some unforeseen condition arises, I estimate that the production of oleomargarine for the present fiscal year will not exceed 50,000,000 pounds, or a falling off of another 40 per cent. I base this estimate upon the fact that during the first four months of the present fiscal year, viz., July, August, September and October, the make of oleomargarine in the city of Chicago is but 114,398 fifty-pound tubs, compared with 182,099 for the first four months of the previous fiscal year—the first under the new law—and 284,764 tubs for the same months of 1901, when the old law was in force. This is a falling off from last year of 67,601 tubs at Chicago alone, and upon this basis Chicago producing two fifths of the nation's output) there have been 169,151 tubs, or about 425 cars less oleomargarine made in the United States the first four months of this year than last. Compared with the same months of 1901, the last under the old law, the falling off the past four months has been 451,800 tubs, equaling 1,120 cars, or about 70 per cent, the make for the United States for July, August, September and October of 1901 being 679,800 fifty-pound tubs, and during the past four months 228,000 tubs. That is, the longer we go the less we make.

PRESENT LEGAL STATUS.

Two cases involving the validity of the new law are now in the courts. One, taken up from Cincinnati, will be argued before the Supreme Court of the United States at Washington November 30th, a week from Monday, the oleomargarine interests having retained to represent them the best legal talent in the country. The other has not yet gone through the lower court. The only court decision which has been handed down in relation to the law to date has upheld its validity. The National Dairy Union is watching both cases in court and, with the support of the dairying public, will see that its interests are properly represented The case which has gone to the supreme court and will be argued next Monday is one from Cincinnati, in which the manufacturer of oleomargarine took highly colored butter, mixed it with oleomargarine and put it out under the quarter cent tax stamp, claiming that under the law, butter being a part of oleomargarine the use of butter, even if colored, in oleomargarine was not artificial coloration. The lower court decided against the oleomargarine manufacturers and they have appealed it to the United States court. This case will be argued by Mr. Guthrie of New York in the supreme court a week from Monday.

However, in the cases in the courts, the government has great incentive to protect our interests. During the first fiscal year under the new law, ended July 1st last, the Government collected from makers of colored oleomargarine the sum of $272,044.48 for ten cent tax stamps upon the 2,720,440 pounds of artificially colored oleomargarine which they produced in a legitimate way. They produced it as artificially colored oleomargarine and paid $5 a tub tax on it. It gives you a little idea about how cheap oleomargarine can be made, if they can come in and make that much and pay ten cents taxes. However, this only amounted to about 4 per cent of the entire production. Added to this are taxes at ten cents per pound in shape of fines, amounting to over $200,000, which have been assessed against oleomargarine makers, divided as follows, as nearly as can be ascertained without access to the reports of the treasury department:

Wm. J. Moxley & Co., Chicago	$ 28,449.00
Oakdale Manufacturing Co., Providence, R. I	60,000.00
Globe Manufacturing Co., Providence, R. I	40,000.00
Vermont Manufacturing Co., Providence, R. I	35,000.00
Kingman & Co., Indianapolis, Ind	14,000.00
Hammond Manufacturing Co., Hammond, Ind	7,000.00
Cudahy & Co., Omaha, Neb	17,000.00
Total	$201,449.00

Moxley, of Chicago, made 284,000 pounds of oleomargarine in which he introduced an oil, claimed to be cottonseed oil, but which proved to be a preparation of palm oil with cottonseed, and the government presented him with a bill for $28,449.80 being ten cents per pound tax on all the goods he had put out of this kind. He paid the penalty and has now sued the Government for recovery. This case will come up in court in Chicago some time in December.

The Oakdale Manufacturing Co. of Providence, R. I., put out 600,000 pounds of oleomargarine containing the forbidden palm oil, sold it as uncolored oleomargarine, and the Government came onto them and demanded $60,000. The demands of the Government when made upon a manufacturer means that manufacturer must immediately pay the money or the Government takes charge of his factory. In the case of the Oakdale Manufacturing Co., which is the largest oleomargarine establishment in the East and one of the largest in the country, it could not meet the demands of the Government and went into the hands of a receiver.

The Globe Manufacturing Co., of Providence, also used some of this forbidden oil to color their oleomargarine, put it out under the quarter cent tax, and were called upon for $40,000 by the Government.

The Vermont Manufacturing Co., also of Providence, was called upon for $35,000 by the Government in the shape of fines.

Kingman & Co., of Indianapolis, were assessed and paid $14,000.

Cudahy & Co., of Omaha, came in contact with a smart young man from Kingman's plant, who told them he had a secret way of making oleomargarine just as yellow as ever; they took the young man up; he made oleomargarine for them one month and the Government presented them with a bill for $17,000 for the oleomargarine which they thought to be (and I presume in good faith) uncolored, but they had been deceived by their maker and will be compelled to pay $17,000 and it will take them some time on uncolored oleomargarine to make this profit.

The Hammond Manufacturing Co. of Hammond, Ind., was assessed $7,000.

These are the amounts the Government has assessed against manufacturers who have tried to violate this law. I want to say to you in this connection that while under the old law oleomargarine was made in imitation of butter and was sold as butter, manufacturers could get good prices for it and make big money. It was nothing for William J. Moxley of Chicago to put away $300,000 in a safety deposit vault at the end of a year as a result of the profits of the business of the year. Things are different now. The oleomargarine business is conducted differently, for this reason: When colored oleomargarine was made and every retailer had an incentive to sell it as butter, he was always liable to prosecution either under the Federal or State laws (and we endeavored to do our part in Chicago towards making life a burden to him). The consequences were he would not dare sell oleomargarine unless backed up by the manufacturers, who would indemnify him against the payment of fines in case he should be arrested for fraud. The packers, who have naturally the best facilities for making oleomargarine, in our city at least (Chicago), would not stoop to this. They refused absolutely to indemnify any retailer who fraudulently sold oleomargarine. That opened the field for a class which was known as independent oleomargarine makers who came in and said to a retailer, "See here, I am making oleomargarine that I will sell you for fifteen cents a pound and you can sell it for butter at twenty-five cents. While it is true that Swift & Co., or Armour & Co., will sell you oleomargarine at thirteen cents, they will not defend you, consequently you do not dare to sell it for twenty-five cents. You take our goods and sell them for twenty-five cents and if anybody interferes with you we will come into court and employ counsel to defend you and pay your fines. Go ahead and sell our goods and you can make money." The result was the retailers were all driven to buy goods of these independent people, because if they did buy of the packers these independent manufacturers had men going around and threatening them with arrest and driving them out of the business, or driving them to the independent manufacturers. That enabled those independent manufacturers to get from one to two cents a pound extra for their oleomargarine, and it did not cost them one quarter of a cent per pound to do the protecting. In that way they corralled nearly all the business and were making a big thing.

What is the condition today? With uncolored oleomargarine, with the profit squeezed out of the business, there are practically no prosecutions for the sale of oleomargarine for butter. A firm can just as well buy his oleomargarine one place as another. The competition is so keen that instead of there being from one to three or five cents to fight the law with as formerly, they are getting down to a quarter of a cent. The independent manufacturers are being driven out of the business.

Mr. Burridge, of Cleveland, Ohio, who is here on the platform tonight and who will address you upon this subject later, tells me that the Union Dairy Co., of Cleveland, one of the largest oleomargarine manufacturing companies east of Chicago, has gone out of business as a result of their inability to make oleomargarine in competition with people who are selling it on its merits today.

The foregoing amounts are penalties levied for the use of cottonseed oil containing the forbidden palm oil, used in 2,000,000 pounds of oleomargarine put out under the quarter cent tax for the uncolored product. This makes a total of $490.493 in these two items for the past fiscal year alone, which the Government would be compelled to refund should oleomargarine makers win these suits and added to this would be almost as much more on retail licenses for colored goods, and the amounts paid thus far this year for ten cent tax stamps. In short, the internal revenue department has in these suits a stake of nearly a million dollars for the Government, making the cases so important that we believe the department will leave no stone unturned to win. We must understand one thing in connection with this case, that the Government and Government attorneys are not as familiar with the technique of this matter as those who have spent years in its investigation, as have the officers of the National Dairy Union.

STATUS OF THE ORGANIZATION.

The work of the National Dairy Union during the past year has been one of effort to establish a surplus fund to be used in case of emergency which is certain to arise. At our last annual meeting at Milwaukee announcement was made that the Creamery Patrons' Handbook had been prepared to be placed upon the market for the purpose of raising funds. It was also decided to request creameries to subscribe 1 cent per tub upon their product to assist in this work.

During the past year over 19,000 of these books have been sold or consigned to butter-makers to be sold to patrons. These books cost the National Dairy Union $800 for engravings, composition, imposition, electrotypes and compilation. Paper, press work and binding cost $4,336.51. To express them to the nearly 2,000 agents who pushed their sale cost $1,402.65, besides the services of a bookkeeper to keep track of 2,000 accounts ($371.00 for the year), a stenographer ($781.00) and the services of the vice president for a large portion of the year, whose salary at $100 per month amounted to $800, and expenses of $827.59 in attending meetings brought the expense for the handbooks up to $1,627.59, a total of $9,318.75, as nearly as can be figured.

From the sale of the books to November 1st we received in cash $9,487.18, and have in the hands of agents throughout the country enough more unpaid for and unsold to bring in $6,270.25 additional. In short, the profits of the National Dairy Union upon the Patrons' Handbook depend upon the successful sale and collection for the 9,000 copies unaccounted for to date.

From the one per cent tub subscription and other contributions $3.940.63 has een received during the year. This has been very largely accomplished through the personal work of Vice President Shilling and Special Agent James A. Harris, the salary and expenses of the latter amounting to $773.77 for the six months he was employed by the National Dairy Union.

Other items of expense for the year are printing, aside from Patrons' Handbooks, $759.28; mailing, addressing, etc., outside the office, $224.14; commissions, $62.50; exchange on checks, $60.85; office rent, $177.00; office expenses, typewriter, etc., $175.85, and $66.25 expense account—the only one incurred during the year—by your secretary and treasurer.

A detailed and tabulated account of receipts and expenditures, as shown by the books of the National Dairy Union, follows:

CHICAGO, ILL., NOV. 19, 1903.

CONDENSED FINANCIAL STATEMENT OF THE NATIONAL DAIRY UNION FOR THE YEAR ENDING NOVEMBER 1, 1903.

Credits.

November 1, 1902—	
Cash on hand	$ 136.27
Patrons' Handbooks cash sales	3,294.60
Sent on commission, paid for	5,348.94
Received from 1 cent a tub subscriptions	3,940.63
	$12,720.44

Debits.

Paid C. Y. Knight, expenses	$ 66.25
S. B. Shilling, salary and expenses	1,489.44
J. A. Harris, salary and expenses	773.77
Bookkeeper	371.00
Clerk	255.00
Stenographer	781.00
Office expenses	369.05
Exchange on checks	60.85
Money refunded	4.75
Patrons' Handbooks	8,075.55
Balance on hand	473.78
	$12,720.44

The auditing committee simply grouped the items a little different from what I did in this report and made a little different charges. Totals are all the same. They called some things expense for the one cent a tub that we might say was on the books. There is no difference in the totals at all, only what we might consider belonging to the Patrons' Handbook and they consider belongs to some other department.

In this no account is taken of the money which is out in the shape of books in the hands of butter-makers, for the reason we cannot account for the number sold. Since the first of November, however, after this account had been made up, we have received $399.06 and paid out $147.84, which leaves our balance today in the treasury something like $725. We have gained that much since the first of November.

It has been my ambition, ever since I commenced this work, to accumulate enough money in the treasury to make us feel that we were safe at any time from attack, having the money ready to take up the defense and then drop the work and turn it over to somebody else. And I have struggled for the last year, undertook the sale of this book in order to do it, and have worked right along with that intention, but, as I told you before, we find our efforts are out in the country yet.

The discouraging part of our work is the effort and expense necessary to keep up interest in the cause. It is almost impossible to secure financial support from co-operative creameries without a personal visit from some representative of the National Dairy Union. An analysis of this personal work shows that upon the basis of one cent per tub it costs almost as much to get the money as it amounts to. The average creamery is supposed to turn out not far from 90,000 pounds, or 1.500 tubs of butter per year. While our representatives have only visited the more important co-operatives, those visited, when sending in their subscriptions for the year, have shown an average of only about 1,000 tubs. We have spent money visiting many where pledges have been received and no attention paid to their fulfillment. We started in the work a year ago with many promises from prominent concerns which have been forgotten by them, and repeated communications from the secretary's office fail to bring a response. Had we received all we were led to believe would be subscribed, we would have had in our treasury from four to five thousand dollars instead of that many hundred. Which reminds me of a story,—

I never think of our financial condition but what I think of an incident which occurred once when I was South in Florida. where I had the pleasure or misfortune to live a few years in my early days. There was a darky church $150 in debt and the minister was very anxious to pay off the mortgage. He took the matter up one night when it happened there were ten ministers from the North in the town and had gone to church to see what a darky church was like. The old darky preacher put the thing so pathetically and exhorted so earnestly for a large subscription to pay the mortgage off the church that the ministers concluded they would give him a surprise, and thought the expression on his face when he saw what they had done would be worth what it cost them. So between them they subscribed one hundred dollars, ten dollars a piece. The strange part of the story is that one minister happened to have a one hundred dollar bill. They thought it would be very nice and the surprise would be greater if they changed these ten dollar donations and put the one hundred dollar bill in the hat. So they did it, and when the deacon came around with the hat the minister who had the one hundred dollar bill dropped it in. The old deacon went back as fast as he could, up to the minister, called him to one side, beckoned him over, and they got their heads together and held a long and earnest consultation. Finally the old darky preacher came to the front with a sort of dubious look on his face and said: "Bredern and sistern, it seems as though dere had been a kind of divine visitation here dis evening. As nearly as I can make out from counting de money in de hat we have $147.49 and two collar buttons, provided the hundred dollar bill wat the gentleman in de back part of de church put in de hat am genuine." The National Dairy Union has a surplus in its treasury, or rather accessible, provided the $9,000 we have out among the bututer-makers and others who have undertaken the sale of our books is accounted for.

For the book hundreds of butter-makers have done their part well. Others have received consignments from us, express prepaid, and returned them "collect" without even opening the package, not only failing to do anything for us, but practically eating up the efforts of others. As a matter of fact, your secretary has become weary of spending a dollar to collect a dollar, having at the end of the year only a few hundred dollars ($473.78) in the treasury and a few thousand dollars of anticipation and promises. Not only is there no satisfaction in wasting time in this way, but this fruitless work is very likely to create the impression that there may be a leak somewhere, particularly when it is shown that without any active fight on hand more than $12,000 have been spent in a year. There are many who do not stop to consider the fact that the National Dairy Union has been run during the past year almost as a business venture, that it has printed a book and put it on the market at prices lower than any private individual or firm could have afforded to have done it, and that more than 75 per cent of the organization's expenditures have been in the production and handling of this book, yet I would not think for a minute of bringing this report before this meeting without first having submitted the records of my office to an auditing committee, appointed by the president of an outside interested organization, who has been afforded every facility to verify every item which goes to make up the various totals, and who will report his findings here tonight.

In conclusion, I desire to say, as you may readily understaand, that I am weary of this work. I have held the office of secretary of the National Dairy Union for six years. Five years of this time has been spent in the most aggressive warfare ever undertaken by any organization. We passed an anti-color bill in the Illinois legislature in 1897 only after an almost hand-to-hand fight in the Senate and having our bill stolen in the House, because in the State of Illinois the city of Chicago holds more than 33 per cent of the representation, which is solid against anything the agricultural interests may want. In the spring of 1899 we passed a bill creating the Illinois food commission to enforce the law of 1897. We then began our active work in behalf of the national law, which required three years of effort, the history of which you are familiar with. We now have before us vexatious legal and technical questions which are to those in places of responsibility like an aching tooth; they don't take a great deal of actual physical effort or time, but they keep one in a frame of mind and suspense which prevents him doing much of anything else.

How we are going to get along without Governor Hoard I do not know. His name was a source of confidence in the organization and his counsel a continuous balance wheel. It was he who gave your secretary his first insight to what is necessary in securing legislation in behalf of the farmer. So long as his name remained at the head of the organization he could not escape the responsibilities entailed. Governor Hoard has thousands of friends and acquaintances among the dairymen who know no other in the organization. Each one of these friends appeared to feel called upon to write him, as president of the National Dairy Union, whenever anything happened that was not understood. He had either to retire from the office, devote a large portion of his time to answering this correspondence, or ignore it. The latter he would not do, and have we any right to expect him to further carry the former burden?

Personally I feel that I too should be permitted to shift the responsibility which I have carried the past six years. I cannot see my way clear to continue the work. Justice to my own personal interests and the welfare of those with whom I am associated and those depending upon me demand that I cease to spend my time in this great struggle and begin to look out more for my own personal future.

I realize, of course, that during an experience of six years in this work I have made acquaintances and accumulated knowledge which is almost indispensable to the office. Yet there must be a change some time. I can not continue the work forever, and it must always be carried on by somebody, or we will very rapidly lose all and more ground than we have gained. There will never be a better time to change than now. So it seems to me that right now is a good time to determine upon some plan or organization for the future which will put the National Dairy Union upon a solid foundation. This means that promises for its financial support must be arranged for and in some manner that will not cost a hundred cents to collect a dollar.

And in final conclusion I will say I have exhausted my ability along this line. In six years I have worked every scheme which my brain can devise for raising funds to carry on the work. I confess I am at the end of my rope, and it's up to those who are interested and benefited to decide in regard to the future.

Now I have done just as I said here in this report. I have exhausted every scheme that I can think of to raise money; I have worked the whole ground over; I have come to you with all kinds of schemes and plans and propositions to raise money. I can not think of any more. I have racked my brains. The trouble with the dairymen, and all other interests as far as that is concerned, is they are like the man from Arkansas when he was asked by the Arkansaw Traveler why he had no roof on his house, and the Arkansan said: "When it rains I can't put the roof on, and when it does not rain I don't need it." The trouble with the dairymen is when the time for fighting arrives they are not ready to fight, and when there is no fighting on hand they do not want to be bothered. That is the situation.

Now I requested the Elgin Board of Trade that they send a committee to the office of the National Dairy Union to look over its books. It was my desire when I came before you tonight to be able to present to you, through the eyes of others, some sort of an idea of what has been done. The Elgin Dairy Board of Trade was requested to appoint a committee to come in and audit the books of the National Dairy Union. The bookkeeper was placed at their disposal and Mr. Joseph Newman, whom the Board appointed to do this work, who is president of the Illinois State Dairymen's Association, spent two days in the office, and he will now tell you what he found and make his report. We should be very glad to have and court the fullest investigation on this matter, and invite questions as to the disposition of any of these funds. The more you can ask and learn the better it satisfies us.

I thank you for your kind attention. (Applause.)

THE CHAIRMAN: I have the pleasure of introducing Mr. Joseph Newman, of the Elgin Board of Trade, who is a member of the auditing committee auditing the secretary's books.

REPORT OF AUDITING COMMITTEE.

Joseph Newman, Elgin, Ill.

Mr. Chairman, Ladies and Gentlemen: I do not know just why the Elgin Board of Trade was requested to do this work, as we certainly have not been hounding the National Dairy Union as to what the funds are or where they came from. We know where they have been used without going into the books, but, as the gentleman has said, I took it when they asked me to do this work and I found out it was to be a genuine auditing. I was to go into the books and find out what I could for you. Of course it is your work and Mr. Knight has felt that this should have been done for you. It has been neglected until this year, so when Governor Hoard and the officers of the association insisted that we should do it, after talking with him I consented to act. Knowing something about books. I believe I have dug out facts for you and will present them.

I will say here, of course, an auditing committee has to do with just figures; but the National Dairy Union wanted me to give you more particulars and details as to how the office was conducted, etc., so I have gone into it more fully than mere figures.

I beg leave to report as follows:

At the request of your officials, to the Elgin Board of Trade, to appoint someone to audit the accounts and books of your Secretary-Treasurer, Chas. Y. Knight, I was the one selected, and after spending two days in examining the books and vouchers and obtaining information from the various employes, I would report to you as follows:

The office is connected with the Chicago Dairy Produce at 154 Lake street, Chicago. One room is set apart for and is used by the National Dairy Union, for which they pay a rental of fifteen dollars per month and janitor service of one dollar per month. The office force consists of a stenographer, who puts in her whole time at fifteen dollars per week, a bookkeeper half time at seven dollars per week, and a clerk part time at five dollars per week.

Mr. Shilling, in the absence of Mr. Knight, is in charge, balance of time traveling in the interests of the association, at a salary of one thousand two hundred dollars per year and expenses. Mr. Harris travels in Minnesota at a salary of six hundred dollars and expenses. I find no salary is charged up for Mr. Knight, and during the past year only sixty-six dollars and twenty-five cents in traveling expenses has been paid him.

The large item of expense during this past year was for 19,389 copies of the Patrons' Handbook, for which about eight thousand dollars was paid out. This included the express charges and other necessary expenses, both for getting up the book and delivering same to the purchasers and sent out on commission. The ledger shows books out on commission to several hundred creameries, amounting to about six thousand dollars, that are not settled for, and about eight thousand five hundred dollars has been received from the sale of books. I saw all the bills, went into the files, took all the bills, examined them and saw they were properly receipted by the Regan Printing Co., of Chicago, where the books were made, and all the separate bills that went to make up the large item of $8,000.

The donations from the one cent a tub contracts have netted this year nearly four thousand dollars.

I found the books kept in a systematic manner and balanced each month, and are entirely separate books from the Chicago Produce books, with the exception of the cash account, which each day is balanced into the Chicago Produce account. In other words, the cash account on our ledger reads "Chicago Produce account." On looking into the reason for this, I found that the account was more than half the time overdrawn, and we owed Chicago Produce on January 31st of this year over $100; February 28th, $400; March 31st, $1,130; April 30th, $1,750; May 31st, $2,000; June 30th, $1,700; July 31st, $1,600, and August 31st we had a credit again of $200. Hence, by keeping the cash together we have received quite a benefit by having our bills paid promptly without formally borrowing money.

I found that all items paid out had voucher receipts filed away according to date, and easily accessible. Mr. Knight and all the office force were very courteous to me and gave me every assistance possible to get at the facts wherewith to make this report. I went over several months and took every voucher, no matter if only for twenty-five cents for express receipts, went over them very carefully, took at random one month and found all recipts in their regular order for every item, no matter how small or how big. I went over several months that way. I did not go over the whole year, for it would take me weeks to do that. I satisfied myself that everything was done in shipshape.

I would recommend that two new accounts be opened, one showing the amount paid in each month on the "one cent a tub contracts," and one "Patrons' Handbook account," so that anyone interested can see at a glance the amount received from each source at any time, without going over the petty accounts of same, which, as I have said before, are several hundred.

Since November 1, 1903, the services of Mr. Harris and the clerk in the office have been discontinued. The statement just rendered, showing a balance on hand of $473.48, I found agrees with the ledger balances.

Respectfully submitted,

Joseph Newman, Auditing Committee.

Elgin, Illinois.

THE CHAIRMAN: You have heard the report of the secretary-treasurer and of the auditing committee. What will you do with it?

MR. NEITERT: Mr. President, I believe that everyone here is satisfied with this report. I am pleased to state that it is entirely satisfactory to my mind. I have no reason, in the first place, to question any of the officers of the National Dairy Union or their acts, and it certainly should satisfy the minds of the most skeptical when our friend Newman, as auditor, presents his report so conscientiously and conclusive that everyone ought to be willing to accept it. Therefore, it gives me great pleasure to move that the report of the secretary be accepted as read, approved and placed on file.

Motion seconded by Mr. Schreiber, and duly carried.

THE CHAIRMAN: We have with us the representatives from two markets, Chicago and Cleveland, and we are going to call upon them to tell us the conditions that existed before and the conditions as they exist since the enactment of the oleomargarine law, and how they regard that law.

I will first call upon Mr. T. E. Purcell of Chicago, president of the Chicago Butter and Egg Board.

ADDRESS.

T. E. Purcell, Chicago.

Mr. Chairman, Ladies and Gentlemen: I was very much surprised a couple of weeks ago to have our friend Mr. Knight come and ask me to come out here tonight and tell you creamery men what the butterine law has done for Chicago butter interests. This is the first time I have ever been called upon to make a public address, and it was in fear and trembling that I consented.

I am in the same office building with Mr. Knight and I have listened to the troubles and tribulations of the National Dairy Union for some time. It seems strange to me that a large interest like the butter interest of the country should have any trouble whatever in supplying all the necessary funds for such an organization as the National Dairy Union. These officers have been with you now for a long time; you know what they have done for you; they have been tried and have not been found wanting.

One of the most difficult things to do in this country is to go to congress and have congress pass a revenue measure. They did that for you and for the salvation of the butter interests of this country. Let me tell you as quickly as possible, because the hour is growing late, in regard to butterine in Chicago.

I have been on the market for twelve years. I first went with Mr. Wrightson, who was one of the largest dealers in butter at that time in the country. That was back in '91. We did a large business; we bought from thirty-four jobbing houses in the city of Chicago, houses that had a butter business where they sold in a wholesale way, and business continued good both to the commission houses and brokers until along in 1894. About that time things began to show something was wrong, and along in '95 it commenced to get worse. Then we called a meeting to talk the matter over. We knew there was an increased sale and consumption of butterine, and with the assistance of Mr. Knight and a few others on our market, we sent a delegation to Springfield and had passed by our legislature there a law similar to laws enacted in other states, which had apparently been all right in those states. We felt quite happy and cheerful when the delegation came back from Springfield and stated that the law had been passed. We felt that we would regain our prestige as a butter market. Unfortunately, our joy was short lived. We never got a conviction under the law, and we then realized what a desperate proposition it was to go up against the butterine crowd, men who were making millions and had political influence to undo our work.

In 1900 things began to get desperate, and I remember when Mr. Price, one of the old wholesale merchants of our city who had retired from the butter business three or four years, said to me one day: "Purcell," he said, "how is business?" I replied, "Business is all right, but there is no butter. You know we have few jobbing houses now." He then asked how many are left there. I ,counted them up, I knew them all and there were eight. In ten years the butter business in the great city of Chicago had declined from thirty-six jobbers (where it should have increased to fifty or sixty), down to eight, and yet Chicago is one of the most prosperous cities in the Union. The reason was that practically every grocer in Chicago had become an agent for butterine. If this condition had gone on, probably every grocer in the United States would have soon been in the same position. Why? Because they were able to make large profits out of butterine, and grocers are human—they are not in the business for their health.

I am only going to keep you a moment. Mr. Knight then came forward with a proposition to tax colored oleomargarine ten cents per pound. You know the rest. He accomplished his work, he did it well, but we were a little doubtful after the work was accomplished whether it would stand or not. They commenced to use palm oil; we then thought it was all off with us, but the Government came to our assistance and declared that illegal.

What is the condition today in the Chicago butter market after one and a half years under the new law? We have eighty-nine members of the Chicago Butter and Egg Board, some of whom are in the butter business, and probably about thirty or forty are wholesalers. We have regained in a year and a half the business we lost in eight years. What is going to be the future if this gain continues? Chicago will be the great commanding butter market of the United States, and you will need it. For the proper distribution of this article you must have some general distributing market in the Central West. The Eastern cities will take care of their own trade, but the West must have a city which will be able to distribute butter economically, carefully and well. In Chicago we have one of the finest cold storage system railroads running to every point of the compass; we also have the best banking facilities that it is possible to have. You know, if you read the papers, that Chicago banks are probably stronger than those of any other city—they were taught a lesson in '93 and afterwards. All we require now is simply that we be protected as a consuming market.

It has been demonstrated to us that we can never become a great distributing center unless we have the large local consumption which we have today and which we hope we will continue to have.

But gentlemen, it is a surprise to me to hear the report which Mr. Knight has just made; hear him state that you creamerymen would not contribute willingly one cent a tub to protect your livelihood and your business. Why, it is a shame and a disgrace to have such a statement made as Mr. Knight has just read to you. The merchants in the butter business in Chicago have had their business practically annihilated by the ever-increasing sale of butterine, but we have fought continually and have contributed probably more money to the National Dairy Union than any other city in the United States (even under the conditions existing), and I do hope that this will be the last time such a report will have to be made. You creamerymen should come forward with your active assistance. It may be all right today, but tomorrow it may not be so, as Moxley and the rest will not stand back and see their business destroyed without making a desperate struggle. They know every trick of the game, they can shuffle from the bottom of the deck just as nicely as they can from the top, and unless you meet them dollar for dollar they will win out.

In conclusion I would say that you have the most efficient officials at the head of your organization it is possible for you to procure, and I trust you will demonstrate by your action tonight that you appreciate the work they have done and insist that they remain with you. I thank you.

ADDRESS.

I. E. Burridge, Cleveland, Ohio.

Any discussion of the benefits derived from the new law must take into consideration the conditions preceding its enactment, those immediately following and what we may reasonably expect in the future. Anyone at all conversant with conditions in the great "interior" markets of the country preceding the enactment of the law was, in a sense, better fit to judge of the load the dairymen were carrying, than those who are doing business in markets where oleo was not the prime factor. And little as the interior markets of this country have in the past been appreciated, yet they at that time exerted a considerable influence upon the butter market and had great weight n the making of prices and the using of the surplus.

By the term "interior markets" we mean such markets as Chicago, Cleveland, Pittsburg, Cincinnati, St. Louis and a few other smaller ones which, at that time consumed comparatively little creamery butter. but at the present time, are drawing considerable supplies. Great as is the Chicago market, enormous as the demands are from New York and other seaboard points, yet these alone, without the balancing power of the other interior markets, would not have been able to care for the enormous product that we have witnessed the past season.

Speaking of such markets. for instance, as Cleveland. Pittsburg and Cincinnati. In them oleo was "king." In Cleveland probably as much oleo was sold as butter, while in Pittsburg and Cincinnati the quantity sold was several times greater than that of butter. And we say, without fear of successful contradiction, that in ninety-nine cases out of a hundred oleo was sold not only for butter, but for the best grade, and a large contingent of jobbers and dealers was supported by the oleo men, and they in turn used every effort to place oleo first in consumption. Their violations of State laws were constant. When arrested by the State officers for violation their fines were paid by the oleo manufacturer—they were urged to go forth and repeat.

In Cincinnati the business of violating the law was an organized one. The dealers there in oleo were in a combine, every pound sold was subject to tax of one cent. which went into their protection fund. which was used mostly to pay the fines of violators of the law. The scheme of protection in some other cities was carried to as great an extent as in the Cincinnati case. Those interests were thoroughly organized and their influence was not only local, but extended to the State capitals in the different States. Since the enactment of the new law the writer has had from an employe of one of the largest manufactories in this country the statement that the dairy and food commissioner of one of these States was in the regular employ of his company and received his check on pay-day the same as the other employes. This, of course, would be a pretty hard matter to substantiate and can not be accepted as a fact only when considering the source and when one is conversant with the numerous other schemes used to affect and nullify the law.

The organization possessed by the manufacturers of oleo was superb, nothing like it in a business way has ever before existed in this country. The territory was divided and combines on prices were religiously kept. Funds in plenty were forthcoming to protect violators, and this fact of itself was an incentive to men to violate the law, knowing full well that their profits would be immense, and that every violation, even if convicted, would cost them nothing personally. This was a condition closely bordering on anarchy—it stimulated a contempt for the law and paid a premium for its violation.

We presume that the respectable gentlemen who were engaged in that traffic would dispute this vigorously, but it is a fact and is well known to everyone connected with the trade.

The oleo traffic was also a source of what is popularly called "graft" for some of the politicians who ranked high in party councils in the different States. While this probably would be difficult to prove as a fact, yet it is true by implication and could be proven a hundred times over from good, substantial evidence.

The great stimulus for all of this was the enormous profits in the traffic. Immediately following the enforcement of the law, these practices disappeared completely. Many of them had only been hinted at, others were matters of general knowledge. It is perhaps not out of the way to remark here that there were at the time the National Dairy Union started its fight very few men in the country who had a good idea of the traffic in its different phases. It was extremely fortunate, and a fact of which we will speak more fully later, that the dairy people should have secured as their champion a man whose knowledge was extremely broad, greater perhaps than that possessed by any one else, and that he brought to the work that spirit of aggressiveness, coupled with a safe conservatism that assured an honest fight.

To go back to the conditions immediately following the enforcement of the law: The oleo trade was in a quandary; they realized that through law enormous profits must disappear, but they were possessed of their plants for the manufacture of the goods and it was necessary that they should use them, else they would be an idle asset. Following this very soon after the law went into force there appeared on the markets their so-called "uncolored" butterine. Their previous education, their environment and their utter contempt for all law was shown by the eager haste in which they sought to evade the law by incorporating in their so-called "uncolored" goods, palm oil in such minute quantities that it was almost impossible for it to be detected, but which gave a certain yellowish tinge to their product.

However, this was one time that they overreached themselves. In their eagerness to get a reasonably yellow color, they used more of this oil than was safe and the resulting product, after it had been kept for a few days, was good for nothing but soapgrease . The oleo manufacturers had enormous losses from this source. I speak of this understandingly. At the time the new law went into effect it seemed that the handling of oleomargarine would be a legitimate business, that it would be sold on its merits, that people would buy it for what it was. We, in common with other dealers, believed that there would still remain among the cheaper classes a certain demand for these goods and that the lack of color would have little effect, except that it would be sold for what it was and at correspondingly proper prices. We therefore took out a license for the sale of uncolored oleomargarine and during the first sixty days that we handled these goods induced about one hundred of our customers to take out a license for the sale of the goods. In all of these cases we supplied them with their original purchases and not one out of ten of them were able to sell the goods, and not to exceed two or three duplicated their orders. These, too, finally discontinued it. The result of the six months' vigorous campaign among this class of dealers was that we had less trade than when we started. It was demonstrated clearly that people would not buy oleomargarine if they knew it, that is, where they bought the goods for their own consumption.

The trade in oleomargarine in our city has dwindled to next to nothing; before the law went into effect we had a large oleo factory, which has since been turned to other uses, the proprietors discontinuing the manufacture of these goods; not one store in fifty carries them, and on only a few of the stands in the market are the goods to be found. The only demand exists from a certain class of cheap restaurants and boarding houses. Whether the goods are doctored before being served at these places we have no means of knowing. But in so far as consumers buying the goods for their own use, the traffic in Cleveland is completely at a standstill.

It has been an enormous benefit to us in the butter trade, especially in this season of extremely heavy production. Our own butter sales for the month of August, September and October were over 40 per cent in excess of the sales of a year ago. We have also built up a heavy outside trade among communities where "oleomargarine" was solely used, and it is safe to say that there are in our territory alone upwards of two hundred thousand people who are using butter today that have not been for years. The same conditions doubtless exist in all other markets where "oleo" was supreme.

That this has been a wonderful value to the dairy industries can not be questioned, even if prices are not at the present time where producers would like to see them. Had it not been for this new channel that was opened to the butter trade there would have been nothing but disaster for us in the enormous production of this season. However, the greater portion of it has been cared for and has gone into consumption. While stocks are heavier than dealers wish, yet we do not believe that if the present consumption holds good up to the first of April, we will see any stock of butter on hand anywhere in this country. Had it not been for this heavy consumption, stimulated by the discontinuance of the sale of oleomargarine, prices of butter would have had to decline to the level of foreign prices. We have before us on one hand a cold-blooded business proposition, that we fight for the very life and existence of that business, as its prosperity affects each of us in its varied phases and while this is the view that will most likely enlist our sympathies quickest, yet there is another view and of equal or greater importance and that is the duty we owe to the consumer and his posterity.

Let us keep the dairy industry free from the taint of fraud and adulteration. It seems as though we have had the aid of a Helper greater than human, that every phase of our struggle for right had been under the care of One who believes in right, and that justice should prevail. I am glad to believe that the inscription that filled the mind and soul, that guided and directed the leader who has done so much for us all was heaven-born and that God raised him up from among his fellows, to be His humble earthly instrument for good. I believe it would be sacrilegious to neglect, to fail to support, the man who under divine Providence has done so much for the American people. The man who has scotched the serpent of fraud, and under whose guidance greater things are possible. I believe that Charles Y. Knight has done a greater good for the dairy industry than any other man that ever lived. I believe a greater work than that which has been done lies before him. He needs your help, we must lift up his hands and furnish the sinews of war. He is a great general, but a general to win must have men. Who ever heard of a leader going into battle to the tune of the "Dead March of Saul." What he needs is cheerful music, and the steady tramp, tramp, tramp of the boys behind him. Let us back him up. Let us put new vigor in the fight. Let us here consecrate ourselves to this fight satisfied that if our leader can sacrifice so much, that we will give freely of our means and time. Let us encourage him. Let us take a new vow of allegiance to the principles he represents. Let us remember that he is willing to lead and that it should be a welcome privilege for us to follow.

There is always a time in every fight when fresh troops are needed. The butter trade of this country, while we have borne grievous burdens, yet we can bear more and I do not feel we have done all we should do; and for the firm I am with pledge ourselves to give one hundred dollars a year to this Union as soon as it is necessary. All we ask is that twenty more representative commission, butter or creamery men go in with us.

THE CHAIRMAN: As I told you from the start you are going to have a chance to speak on this question. We want to hear from the audience. We do not want to lose time. We want to get your opinion on this question now.

MR. NEITERT.

Mr. President: It seems to be quite a mum spell just now. I do not understand this. Certainly you should not feel discouraged because the officers of this association have had trials and tribulations in raising sufficient funds to prosecute honest laws, to try to get them enacted, in other words to try to see them enforced after they have been enacted; and they have suffered for the want of funds in order to do this and have given liberally of their time without pay. It is no wonder they feel somewhat pessimistic, and have perhaps themselves cast a little gloom over this meeting—not with the intention of surrendering, I know them too well for that.

I wish to state before I go further that the paper we have just listened to is full of meat, full of strong and stubborn truths that have been nicely treated. I only regret that more did not stay to hear the rest of it.

Now the fact is that it is up to the dairymen and creamerymen of this country to say whether they will stand by this warfare for right and honesty and for their interests, or whether they will surrender in disgrace. It is too bad that we have to stand in this hall and plead for aid and support, and urge it year after year whenever we meet; but it is true, it is necessary. It is right that we should all put our shoulder to the wheel. I am not discouraged. I feel that the dairymen are not discouraged, and I feel that if the cause is pushed as honesty and right and equity demands, they will all put on the harness, press hard against the collar and push forward for broader and more close victories.

As has been so clearly stated, you have no common trick or game to deal with. Such men as Moxley, who have the best legal minds that are in the land in their employ. They never sleep when this question is up or when their unlawful business is attacked. Now then, are we to sit still and look on, as it were listless and lifeless, and allow them to place their hands in our pockets and take out the last shilling that is there and ruin the business? As has been stated and as was mentioned in this valuable address that the gentleman just read, it is well that the price of butter did not advance to enormous figures for the interest of the dairy and the best interest of the law that has been enacted, because a howl would have gone up over the country that we were selfish, it was special legislature in the interest of a few. Now the fact is there are millions of dairymen in this country who are interested in this cause. I can not understand why we cannot raise sufficient funds for the good that has been accomplished and through the efforts of our worthy secretary, our president, Ex-Governor Hoard, and others of equal strength and standing in our midst.

We would not have had the law as it is today, which no doubt has put millions of dollars into the pockets of the dairymen of the United States, and I stand here ready to say that it is a wonderful feat to accomplish—to go in single-handed, almost, as they did, into the halls of Congress of the United States and secure the passage of this law with the great opposition they had to contend with. (Applause.)

It is not an easy matter. This is an age of organization and combination. It is necessary for us to combine, but there does not seem to be much of a combination. There only seems to be a few. It is true that every interest in the land appears at the halls of legislation. Whether at State or National halls, that interest has a paid and talented lobbyist, paid attorneys and men that are ever looking after their interests. They never sleep; night or day there is some one on board all the time when questions are up that affect them. It costs thousands to do it, but it pays to do it. And if we do not look after our business with the same diligence and pay the men that spend their time and money and leave their own business to suffer, then we should not have any laws in our interest.

Now then, I do not want to discourage anyone, but I want you to say that I am not a quitter on this subject. I want to stand by it and desire that every creameryman and every dairyman in the country shall stand by it. You have the law enacted, but you place laws upon the statute books and they will never enforce themselves. It is simply by the acts of the people that are in favor of the laws that they will be enforced.

As has been said here this evening, some of the employes of the State, or some food commissioner, it appears too awful to be true, were drawing pay from some of the opponents and still drawing their monthly pay from the State that had them employed. But this is an isolated case these men are astonishing. I have wondered in my own mind, when I have thought about this, how they ever accomplished as much as they did with the little aid they have had. I believe it to be (I would not make the assertion if I did not believe it, its of the mind and not of the heart) that if it were not for the legislation, for the law that was passed, enacted, through the efforts of these men we would be suffering greatly today, we would receive much lower prices for butter than we are receiving at the present time, because it is true that the consumption has been enormous by our people and that has created the markets for butter to a great extent. Still there are thousands of pounds and millions of pounds in the cold storages ready to supply demand as soon as the fresh make is less. We have not been able to export butter and compete with other markets because our people could pay higher prices.

Now as a clear business proposition, if they had supplied them with oleomargarine as in years past (as has been told you this evening of the great reduction in the make since the law was passed) if they had continued to increase their make, reason teaches me, business thought teaches me that it would have cut off the consumption of butter so great that you would have shrunk at least from three to five cents per pound in the price of your butter for the last eight or ten months.

You may think I am strong; this is strong, but it can not be stated too strong because it is truth, and if we do not heed the warnings that are given us in time we will have to suffer the consequence, and naturally we will.

Now then, we have had the report of the secretary. We know how much they have received and what they have expended, and I am astonished at the small showing that has been contributed from the good results that the dairymen and creamerymen have received from this. Now what are we to do? Are we to stand by and let this go by defeault, or are we to continue the good work and help it along?

I, for one, am in favor of urging every one to take an interest in this matter. As said before, we must have an organization. We must not drop it. I presume these gentlemen are tired of their positions. There is no one that would be willing to take the place and do the work for what they have received. I am not talking for pay for them, but I am talking to get the idea before you, to put yourself in their place.

Now if we expect to defend these cases before the Supreme Court of the United States (and as we are well informed they have the greatest constitutional lawyer in this land to prosecute the oleomargarine end of it; that should be convincing to you that they are not playing with us; they are not intending to play a losing game, but hope to win, and when they win disaster will overtake us. But I trust they will not win), but in order to sustain our side of the question we must have legal minds to present our side of the case.

Now there is no question in my mind but what the dairy department has aided us wonderfully at Washington. The people have aided us all over; they have been honest in their intentions in enforcing the law, but this matter has to be kept alive until they are so dead they will never arise again, and now is the wrong time to quit. We have them about two thirds killed already, and do not let us leave enough life so they can ever breathe when we get through with them.

Now then, we are not fighting any honest enterprise (we do not mean to convey that idea here), or any honest product that is put upon the market for what it is. They have the right to be there; we do not object to that, but we do object to having their product sold for what it is not, and that is what has been done. There is no class legislation about this, it is simply that the dairymen are looking after their own interests.

Now do you want a half dozen manufacturers in the United States and a few men to rake in all the coppers and get millions upon millions? We are not opposed to a man honestly acquiring wealth; I respect him if he does it honestly. Or are you going to let the thousands of dairymen in the State and their creameries suffer, and probably in the future bring mortgages on them?

We have heard it told here time and again at different conventions what the cow has done for dairymen in this land. No one has denied it. Now if we kill them off what will the cow do for us? You will not have a market for your product. This may be said in rather a plain way, but these are facts and we have to understand them, as they appear to me, and I believe you view them in the same light.

Gentlemen, I thank you for your attention. If I have not said anything very interesting, or that does not meet with your views on this matter, act as it appeals to you; but if I have I trust you will lend us a helping hand and try to encourage your officers and push our desires and hopes well towards the accomplishment of a thorough finish. (Applause.)

MR. LARSON.

Mr. Chairman, Ladies and Gentlemen: I would like to suggest an original way of collecting money. I believe if we were to start out and print a copy of the proceedings of tonight, so that every one that is interested would understand the straits we are in at this time, mail a copy to and ask every member of the Iowa State Dairymen's Association to contribute one dollar; then go over and ask the creamery butter-makers in the union to contribute one dollar. I do not know the number of butter-makers, but the number is large enough so as to bring in quite a sum. Then ask each creamery, both individual and co-operative, to contribute at least $5, or as much as a good, bright butter-maker can induce them to give up. Then go over and ask every patron to do as much as he can.

I think in this way friend Knight will have enough interested in it so he will not feel like quitting.

I do not know but what this can be gotten at in an easy way and I shall be glad to contribute $10 to start this. I think more will do the same thing. I thank you.

DEWITT GOODRICH.

When Mr. Knight originated the scheme of the Patrons' Handbook, he got up a grand scheme and this has not been entirely exhausted yet. If the creamerymen, even the small number that is here tonight, will go home and take a new hold of the Creamery Patrons' Handbooks, I think a great deal more can be gotten out of it.

A. B. SLAUGHTER.

I do not want to take much time, because I realize that it is late, but the last suggestion by the last speaker touches me. Possibly I have done as much as the average butter-maker in getting rid of Patrons' Handbooks. I do not remember now just how many, but it is close on to one hundred that I managed to get rid of, and I believe that if you could get the butter-makers to wake up to that fact, and get them to take hold of this matter, there would be no difficulty in getting rid of the books. The books sell themselves; there is not a bit of difficulty in selling them.

Now just one or two other thoughts, then I am through. I was in the State of Ohio, a member of the legislative committee of the Ohio Dairy Association, when this suit was brought, and I was delegated to wait upon the district attorney and find out the status of the case, and did so and reported it to Mr. Knight. Now, without reflecting at all upon the Government attorneys, I want to say that the man who now has charge of the case is not the attorney who instituted the proceedings. The gentleman who instituted it is dead, I believe, and his assistant has been appointed in his place. He is a nice young man, but he knows as little about the wiles of the oleomargarine people as we do about the world beyond. He does not know them at all, because I had a conversation with him of some two hours, and I found he did not know anything at all about it.

Now, another thing, I want to say this for Mr. Knight's benefit, and I am not here to throw boquets, but I think I know what I am talking about. I possibly had something to do, indirectly, with the securing of this law. I had an interview with Senator Foraker of Columbus just before he returned to Washington, and he informed me and some other members of our association that he was going back to Washington to vote against the bill and that he expected he would make a speech against it; but before Mr. Foraker had time to get aboard the train, Mr. Knight and others were notified of the fact by wire, and that set the wires teeming with messages such as caused Mr. Foraker and the other senator from our State of Ohio to change their opinions and we got the vote from Mr. Foraker, although he did as he suggested, pulled the teeth of the bill as he thought he had, before he voted for it.

Now there has been another thing stated about Mr. Guthrie, the lawyer they have retained, as the greatest constitutional lawyer in the United States. This is possibly true and I want to say that they not only have the greatest constitutional lawyer, but they have the firm of the greatest tricksters in that high position, and the firm that first took up the defense of this suit in Cincinnati, the firm with which Senator Foraker is connected.

One other thing, I do not believe the constitutionality of this law can be attacked successfully. Senator Bailey, the man who represented the interests of the oleomargarine forces in Congress, admitted, when forced to admit it, that if the bill became a law it would not be unconstitutional because we could not go back of the law and state what the Senators' motives were in voting for it, but they had no moral right to vote for it.

S. B. SHILLING: It seems to be the sentiment of the public that this organization be maintained and it seems a business proposition for us to entertain a motion of this kind and have it as a record. I have felt this way,—that we are working today in a business manner and we have thought that the probabilities are that if we would incorporate, make our body a legal body and make it broader and wider the people would have more confidence in it.

The hour is growing late. I believe the sentiment expressed has been strongly in favor of the maintenance of this organization. I believe if we would pass a resolution that we proceed to reorganize, I guarantee if we can go ahead, if someone will make a resolution of this kind that we can get through in the next ten minutes.

MR. SLAUGHTER: I make the motion that we proceed to reorganize the National Dairy Union.

Motion seconded and carried.

S. B. SHILLING: In order to do that we will have to adopt articles of incorporation and by-laws. In order to hurry business I have prepared hurriedly articles of incorporation and it will not take but a little while to adopt them, elect officers, and then we will be ready to go to work again; but we want more assurance. Someone told me a little while ago that we are going to have a bigger pledge, and a few minutes ago this telegram came in:

COPY OF TELEGRAM.

DENVER, COLO., November 19, 1903.

S. B. Shilling, Waterloo, Iowa.

We will subscribe one hundred dollars for National Dairy Union. Wish you a rousing meeting.

G. E. HASKELL.

THE CHAIRMAN: I will now read articles of incorporation which have been prepared, also by-laws:

CERTIFICATE FOR INCORPORATION OF THE NATIONAL DAIRY UNION.

1. The name of such corporation is the National Dairy Union.

2. The object for which it is formed is to protect the dairy interest from the fraudulent sale of any substitute for the product of the dairy, disseminate dairy knowledge and to in every way further the interests of the dairymen and others engaged in handling dairy products.

3. The management of the aforesaid National Dairy Union shall be vested in a board of six directors, who are to be elected annually, and from said board of directors there shall be annually elected a president, vice president, secretary and treasurer.

4. The following persons are hereby selected as the directors to control and manage said corporation for the first year of its corporate existence, or until the first annual meeting, to be held in the year 1904, viz: .... of whom .... shall be president, ... shall be vice president, and .... shall be secretary and also shall be treasurer.

5. The location is in the city of Chicago, in the county of Cook, in the State of Illinois, and the postoffice address of its business office is at No. 154 Lake Street, in the said city of Chicago.

Upon motion duly made and seconded the articles of incorporation and by-laws of the National Dairy Union were adopted as read.

THE CHAIRMAN: That adopts the new articles of incorporation. Now, gentlemen, we have placed ourselves upon a business basis, something we had not done before. The laws of the State of Iowa, and I suppose the laws of other states as well, require that the articles of incorporation be read and acted upon separately. We have done that and now we can go on incorporated as a legal body.

The next before the meeting is the election of officers.

MR. NEITERT: It appears that we have no president. We are forming a new organization. In view of the fact that we have to have a president, I desire to present the name of a man who is ever diligent in the interests of the dairy and dairymen of this land—a man who has devoted the greater part of his life to the best interests of the butter and cheese and milk production in our land and especially in the State of Iowa—a man who has always been faithful to his trust—a man in whom I have the utmost confidence,—he is energetic and untiring in his efforts and in whatever he undertakes,—a man who can be trusted, and I am not throwing bouquets at him at all, only stating plain facts,—and that man is Mr. Shilling. I desire to nominate him for our president.

MR. FULMER: It seems as though on the present occasion here tonight we have had a sort of new machine presented to us in the new articles of incorporation. It seems to me that the best person to run any new piece of apparatus is the inventor, or originator. Therefore, I take pleasure in seconding the nomination of Mr. Shilling for president.

Motion duly carried.

MR. SHILLING.

Mr. Chairman, Ladies and Gentlemen: I am not going to make a speech. I feel that I have had too many honors. I had one railroaded upon me this afternoon. and one I had hoped to get opt from under. I thank you. I thank you from the bottom of my heart and I stand ready to do this. I accept the office, knowing the conditions, as I have been intimately associated with the office for the last year and understand the condition that it is in. Before this nomination was made I had intended to tell you that I, as an individual dairyman, realizing the importance of maintaining the organization, stood ready to subscribe twenty-five dollars as an individual dairyman in the State of Iowa. rather than have this organization go down; and I stand ready to do this today, to step out and put my name down as a milk producer for $25, rather than see the National Dairy Union go under.

S. B. SHILLING: The next office is secretary and treasurer Is it the wish of the meeting that the two offices be combined in one? I want to say to you that we have thought once or twice that probably it would be better to have the office of secretary and treasurer separated, but it comes back to the same proposition. I do not know where we will take that office unless we leave it in Chicago Dairy Produce hands, because just the minute we get in a hole they put up the money for us and, as has been stated by Mr. Newman, at one time we owed them $2,000. It is not a question of money with the secretary or treasurer. It did not make a bit of difference whether we had a dollar or not. When the occasion came up it made no difference how much money he had to go down for. I have seen the time when we were $3,000 behind in Chicago Dairy Produce money, and I want to suggest that after the thorough and exhaustive report of the auditing committee, I do not see how we can do anything but combine the two offices for the year to come, unless somebody stands ready to take that office. I will say this for Mr. Knight in the office of treasurer, he would be only too glad if someone would take the office off his shoulders and put up the money when we have to have it.

S. B. SHILLING: I forgot the office of vice president. Who will you have for your vice president?

MR. NEWMAN: I would suggest the name of Mr. Lynn to act as vice president.

Moved and carried.

S. B. SHILLING: Who will you have for your secretary and treasurer.

MR. BURRIDGE: There is only one man to nominate—Mr. Chas. Y. Knight. No use in discussing that. (Applause.) I move that we nominate C. Y. Knight as secretary and treasurer with a standing vote.

C. Y. KNIGHT: Gentlemen, you did not hear my paper evidently.

(Cries of question, question.)

C. Y. KNIGHT: I know, but gentlemen, it is hardly fair. This is the sixth time that I have gone through this and it has really gotten up to a point of where I think there should be some change. It is an old story with me; it is nothing new, I have been through it six times.

(Cries of question, question.)

C. Y. KNIGHT: Really, gentlemen, I won't be downed. I never have been downed. (Applause.) I want to say this, that if this is thrust upon me that I will only accept upon the condition that people become interested, and I do not regard it as a good indication to see empty seats tonight. As I said before, I want it understood, I am desperately in earnest in this matter. I have been in the office six years and it is not an entirely new matter. It is merely a matter of duty, and duty I have paid pretty expensively for too. But there are a few of us here tonight, not many of us left, and not enough to do business. When you come to a meeting like this it does not show you have many people with you. I do not suppose that we are bettering conditions very much, but if you are determined that I must continue this work somebody has got to take an interest, more people have got to take an interest, or else I will throw it up between times as Governor Hoard did.

Nomination of Mr. Knight moved and carried by standing vote.

THE CHAIRMAN: The next in order will be a board of three directors.

Moved and seconded that Mr. H. J. Neitert be named as first director.

MR. KNIGHT: Mr. President, seeing that I am in the organization now, I would like to take the liberty of suggesting the name of Mr. Joseph Newman as second director in the organizaition.

MR. NEWMAN: I have more organizations now than I can take care of. I would suggest that Mr. Burridge, of Cleveland, be nominated for the second director.

MR. KNIGHT: I accept the amendment.

Motion duly seconded and carried.

MR. NEWMAN: I suggest Mr. Haskell as a friend of the association for the third director.

THE CHAIRMAN: Mr. Haskell lives in Denver and so far away that he would be of no use to us.

MR. NEWMAN: I nominate Mr. Mowbray, of Minnesota.

Motion duly seconded and carried.

THE CHAIRMAN: The hour is growing late. I thank you for the way you have stood by us, and if there is nothing more we can consider ourselves adjourned.

ARTICLES OF INCORPORATION OF THE NATIONAL DAIRY UNION.

A majority of the board of directors shall constitute a quorum for the transaction of business.

Article IV. This corporation hereby assumes unto itself all the rights, privileges and immunities conferred by the laws of the State of Illinois upon corporations not for pecuniary profit, including the right to receive, hold and disburse moneys in the furtherance of the above stated objects. All business shall be transacted in the name of the corporation and all purchases of materials or supplies or sales of personal property shall be valued when duly made by the secretary or general manager, or any other person authorized to do so by majority vote of the board of directors.

Article V. All persons who shall have contributed to the support of the corporation to the extent of one dollar or more shall be considered a member thereof. and every creamery company or creamery corporation contributing as a company shall be considered as members of said National Dairy Union corporation, and shall be entitled to a vote therein. Each and every one so contributing shall have the right to participate in all meetings, but said amount must be paid since the last annual meeting to entitle the member to a vote; and a majority of the votes cast at any meeting shall be necessary for the election of officers or the carrying of any pending motion unless otherwise provided.

Article VI. The board of directors shall have power to fill all vacancies in the board, and also any vacancy which may occur in any other offices. They shall determine the number of employes and their salaries and make such by-laws for the government of their body and all officers and employees of the incorporation as it shall deem proper.

Article VII. The private property of the stockholders shall not be subject to the debts of the corporation.

Article VIII. These by-laws may be amended at any regular or special meeting of the members by a two thirds vote of all the members present, but in calling a special meeting for that purpose each member shall be notified in writing by the secretary, of the time and place of said meeting, at least ten days prior thereto. The deposit of such a notice in the postoffice, addressed to such members, shall be considered a compliance with this requirement.

All special meetings shall be called in the same manner, and the object of the meeting shall be stated.

FRIDAY AFTERNOON.

NOVEMBER 20, 1902.

THE PRESIDENT: Ladies, Gentlemen and Boys—that is Butter-Makers: I want to say to you before we commence our exercises this afternoon (I am sorry there are not more butter-makers here, but having been at one time a butter-maker myself, I know the conditions the boys have to labor under, and I knew, when we had so many butter-makers here the first day of the meeting that we could not expect a very large crowd the last day, because their duties require that they shall be at home at least by this time), but I want to say that on the first day I requested that the butter-makers would not take advantage of the liberality (I might say) of the executive committee in admitting them to the butter-room in classes, and I feel that they have not done so.

I feel that so far as it has been possible they are loyal to us, and I want to say, boys, I thank you and I am proud of you. I am proud of you for more reasons than one; I am proud of you for the loyalty you have manifested to the dairymen and to our association, and I am proud of you, and I want to thank you, for the way you backed up the officers of this association at this meeting.

We have established a precedent. We have had more butter on exhibition in the State of Iowa, notwithstanding the disadvantages under which we have labored, than has ever been exhibited here before. Another thing I am proud of is the fact that the average score is over 92—92.33, and Professor McKay tells me that it is as fine a lot of butter as he has ever scored at this time of year. And I want to say further that Mr. Grude, the gentleman who bought the butter, told me today that he considered it the finest lot of butter he ever purchased at a convention. I do not know how much this may mean, not knowing what convention butter he has bought before, but that is what he said.

Now, in conclusion of this short talk, I want to say we are going to have as good a session this afternoon as we have had since this convention commenced. Just one thing more, I want to say that we feel gratified at the interest you have taken in the way we have opened the butter-room. Professor McKay tells me that it has been an enthusiastic lot of boys that have visited the butter-room. We did the best thing possible when we opened that room to you and, so far as I am concerned, I feel we made no mistake, and hope we will be in position to do the same next year. We will now proceed with the program.

The first on the program this afternoon is "Losses and Profits in the Creamery Business," by Prof. Geo. L. McKay, of the Iowa Agricultural College. It does not seem to me necessary to stand before you with an introduction of this gentleman, but I want to say to you now that if there is a friend to the butter-makers in the State of Iowa today, if there is a man in Iowa who has your welfare and interest at heart, it is Professor McKay; and I do not believe it is necessary for me to tell you that from the fact that he inaugurated the six months' contest and carried it on when there was no call upon him to do this except to advance your interest and knowledge as butter-makers. He needs no introduction.

ADDRESS.

PROF. G. L. MCKAY, AMES.

I am pleased to be present at this meeting, but I am sorry to see the small gathering. This is a butter-makers' convention, and I believe a butter-makers' session should have been called earlier. However, the officers will probably have more experience another year. They have worked hard to make this one of our best conventions and we will have to put up with it.

Mr. Chairman, Gentlemen: The subject assigned me, the "Profits and Losses of Dairying," I find is a very important one at the present time, owing to the decline in the price of beef.

When our worthy secretary first notified me, I immediately began to look into this subject and prepared an address on milk production and the breeding of the dairy herd. Just as I had completed my work I was notified by the secretary that I was expected to speak on the manufacturers' side, so I found myself minus a speech. However, I can not refrain from making a few remarks on the producers' side of the question, as I believe there are greater losses on the part of the producer than in any other place in connection with the dairy business.

In the Middle West we have four states that are particularly noted for dairying, Iowa, Minnesota, Wisconsin and Illinois. Iowa, Minnesota and Illinois are especially adapted for butter-making, Iowa being the banner State, as more butter is made here than in any other State in the Union. This has the effect of making us rather boastful, in fact it is a common thing to hear some of our public men eulogize this State so much that we sometimes overlook what they are doing in other states.

It is true that we have many things to boast of, but when we approach the question of milk production we find that we have not kept abreast of the times as compared with the advancements made along other lines of agricultural pursuits.

In the year 1830 it required seventeen and three quarter cents worth of labor to produce one bushel of wheat. In 1896 it required but three and a half cents. In 1850 the average time required for producing a bushel of corn was four and a half hours. In 1900 we find this reduced to thirty-four minutes. Take up the progress that has been made in the horse business. Not many years ago a three-minute horse was considered quite a novelty; today a three-minute horse ranks nothing better than a good driver. When we speak of a fast horse now, we look for a two-minute horse.

See the great progress that has been made in the beef business, good sires selling way up in the thousands. What do we find in the dairy business? the average of our State one hundred and forty pounds of butter per cow, in this enlightened age. We certainly have nothing to boast of in such a record as this. It is true we have some herds in the State that are averaging over three hundred pounds per cow. There is no reason why every dairyman in the State should not strive for a herd of this kind. When we get such herds we will hear no complaints that dairying does not pay.

The rapid increase in the price of land during the last five or six years makes it necessary that farmers must farm more intelligently than they have ever done before. Economic problems must be studied more carefully if they expect to get adequate returns from the money invested. We have a country as well adapted for dairying as any in the world. Our soil is rich, our climatic conditions are good, and we have an abundance of grass and pure water. In connection with this we have a progressive, intelligent people. Nevertheless, we must admit that we are producing milk just about as expensively as we did twenty years ago.

How many silos have we in the State? I could possibly count them all on my two hands. It is estimated by the Wallaces' Farmer that one acre of the average Iowa corn mill make fifteen tons of ensilage, and two tons of ensilage are equal to a ton of the best clover hay. Forty pounds of ensilage will keep a cow a day and a ton will keep her fifty days, or an acre of Iowa corn would make enough ensilage to keep a cow two years. There is no better food for dairy cows, with a little grain added, than ensilage. It is a good succulent food approaching nearer the grass condition than most any other food.

We hope the time is not far distant when we will see a good silo on almost every dairy farm in the State. Not only this, but we will see alfalfa grown in abundance, as it is one of our cheapest sources of producing protein.

We can never expect to make much progress in dairying until more intelligence is displayed in the production of milk. This certainly opens a large field for future investigation. A lot of useless writing has appeared in many of our agricultural papers within the last few years on the merits of the dual purpose cow and the special dairy type. What we want is a cow that will produce three hundred pounds or more of butter in a year. It does not make much difference whether she is a dual purpose or a special dairy type. If she can produce this much butter she is entitled to the name of a dairy cow.

Iowa is a natural corn State, hence the value of the calf should be taken into consideration. If we can get a good large cow that can make three hundred pounds of butter, and at the same time produce a good calf, she is a very desirable animal to keep. No practical farmer can afford to keep a cow for the value of the calf alone. The low yield of butter in our State is not due to the kind of cows kept as much as to the care they receive. Cows are like people; they only do their best under the most favorable conditions. It takes about sixty per cent of the food consumed to sustain animal life, and the profits must therefore come from the extra food consumed. We can not expect to let cows run out in all kinds of weather and live on the roughage picked up around strawstacks, and then give the same returns as cows that are well cared for.

At our school we have a number of Shorthorns and Shorthorn grades that are producing from three hundred to four hundred pounds of butter. These are the results of intelligent feeding and proper care.

A great many rules have been laid down for the selection of a dairy cow, such as deep barrel, sloping hips, small neck, broad head, full eyes, and even the length of the tail, have been taken into consideration. While many of these points would give some indications of the dairy type, the best test is a good pair of scales and a Babcock tester in intelligent hands. Many of you, no doubt, have heard of the Holstein and Jersey breeders' test for their respective breeds. A Holstein breeder was boasting about the rich milk that his cows were giving. The Jersey man said, "Friend, are you sure that your cows are full blooded Holsteins? I have a sure test for determining Holstein cows." The Holstein man wanted to know what his test was. He said, "When you begin to milk, put a silver dollar in the pail. If the milk is thin enough so that you can see the dollar when the pail is full of milk, you may be sure you have a Holstein cow." The Holstein breeder replied that he had a test that never failed to detect a Jersey cow. When asked for an explanation he said, "Put a silver dollar in the milk pail when you begin to milk, and if the milk does not cover the dollar when you are through, you may be sure that you have a Jersey cow."

A great deal of good work could be accomplished by our creamery manufacturers and butter-makers, by testing the individual herds of the patrons monthly, during the milking period. Some cows are like some lazy men, they make a big spurt for a short time,—that is, they will give a big flow of milk for a short period. The owner frequently only thinks of them when at their best. The only true test is the amount of fat given during the milking period. We are in hopes that the school will be able to take up this extension work in the near future, if we can get the necessary funds. The manufacturing side we find is much in advance of the producing side. as many changes have taken place in recent years in the manufacture of both butter and cheese. Some of these changes have possibly not been for the best, regarding quality. Especially is this true in regard to the hand separator.

Much more will be expected of the butter-maker of the future than has been required in the past, as the advancements made along the different lines require additional skill. In fact, the butter-maker of the future should be a sort of encyclopedia, not only up to date in handling all kinds of modern machinery, but should also understand the latest methods of handling the milk, cream and butter in the best sanitary manner, and should also be able to give information to patrons concerning the feeding and breeding and milk production in the most economical manner. This will be the case, no doubt, as many of our best men in the four-year-course are specializing along these lines, expecting to make dairying a life profession.

The same is true in other states. In the past five or six years possibly the question of butter flavors and the use of starters have received more attention than anything in connection with the dairy business, both from our butter-makers and the experiment stations in general. While good flavor is very essential in butter, as it is this factor that largely gives it its selling value, at the same time there are other factors in connection with the butter business that are very important both to the producer and the manufacturer. I refer to the quantity as well as the quality. During the past few years we have heard considerable contention through the dairy press, owing to one creamery paying a greater price than a neighboring creamery. Various reasons have been set forth for this, but the most common is that the creamery paying the high price has either cut in the test or had cut weights in weighing, or, in orther words, has used dishonest methods.

During the past few years we have been conducting experiments on the question of overrun. We have also been carrying on an educational scoring contest, making complete analysis of each sample of butter sent in each months. These analyses have revealed to us some startling facts on the reason why one creamery is able to pay more than another. In some of these analyses we find a difference of 15 per cent, or, in other words, we find that one creamery makes fifteen pounds more butter from one hundred pounds of butterfat than another. We have makers exhibiting in this contest who have a reputation of paying extreme prices for butterfat. and their butterfat has invariably shown three or four per cent increase over the average. While we have not completed our contest, the indications are that the average water content for butter will run about 12 per cent, but the water content alone does not entirely govern the overrun. We find the amount of casein runs from .7 to 3.27, and the amount of salt from .5 to 4.5. We also find that the butter high in casein will keep about as well as the butter running low in casein, or, in other words, the amount of casein butter contains is not always an indication of its keeping qualities. It depends more on the condition of the casein or on the condition of the cream, or possibly on the kind of wash water used in washing the butter. For instance, we had one sample of butter containing about 13 per cent water, 3.06 casein and 2.95 of salt. This butter, after being exposed to a warm temperature for eight or ten days and then shipped to New York, scored within two points of what it scored at Ames, scoring 94 at Ames and 92 in New York by Mr. Healy. No criticisms were made in either case on the amount of salt. In this case the maker would have an overrun, from the chemical analysis, of almost 23.5 per cent. Now, if this maker had incorporated 15 per cent of water he would have had an overrun of over 26.5 per cent, that is, based on the chemical analysis. Undoubtedly, however, there would be as much as 3 per cent loss in the skimming and churning process, which would of course have to come from the 26.5 per cent. We have no methods to determine how much loss is sustained in the process of manufacturing; we can only approximate this by general good workmanship. Usually the maker who makes good butter does good work along other lines, such as close skimming and good churning, but because a man wins a gold medal or makes highly flavored butter, it is no indication that he is getting a large overrun. I believe the American butter-makers are all pretty weak on this particular point. The chemical analysis of Danish butter shows about 15 per cent water, while the American and Canadian butter shows about 12 per cent. Thus we find the Dane is making about three pounds more butter to the hundred pounds of butterfat than our American butter-makers, providing he has the same amount of casein and salt present in his butter. From my general observations I would think that the average casein content of Danish butter would be much higher than that of American butter, as the methods they use in not washing their butter very much and at the same time chilling it to give it a dry appearance, would have a tendency to incorporate a high per cent of casein. The salt content of the butter is lighter than ours, as the English market demands a light salted butter.

It is surprising, however, how much of the butter exhibited at our contest contained one per cent or less of salt. In nearly all cases the butter having a high per cent of salt showed much better keeping qualities.

In making butter the first consideration should be the quality and the second consideration the quantity. The law, of course, permits 16 per cent of water. I would not advocate going to the limit of the law, as I have no faith or confidence in anyone who is honest because the law compels him to be honest. We could with safety increase the water content of our butter in this State at least 2 per cent. This would give us additional revenue of $558,699.80. To illustrate to you more thoroughly. I will quote the difference between two of our large creameries. About two years ago one of the largest creameries in our State, in a Norwegian community, sent to our dairy school for one of the best butter-makers we had. I sent a young man to their annual meeting who I considered to be one of the best butter-makers in the State. He asked the company $90 per month to take charge of their plant. They were quite anxious to secure his services, but the ninety dollars seemed to frighten them. Another young man who was present offered to take charge of their plant for $55 per month. The young man I sent over stated to the board of directors that he could make more butter than the fifty-five-dollar man. or enough over to meet the difference in wages. The Norwegian directors could not see things this way. One of them said, "The machine skims just as close for that man as for you, and the cream sours just the same. and he churns it and gets just as much butter as you can." so they hired the cheap man. Last spring they entered butter in our educational contest. and comparing their make with that of another creamery of about the same make, we found a difference from the chemical analysis of $17.50 per day, or $445 per month. providing each man maintained the same loss in skimming. The man who got the large overrun got a score of three points higher than the other fellow. and his butter sold at a half cent premium above that of the cheap maker. The one company pays their maker $55 per month, while the other pays theirs, $100. The cheap man made a saving of $45 per month on wages and lost on quantity $445 a month. This brings to mind the old saying of "a penny wise and pound foolish" method of saving.

A maker's wages is a very small item in connection with the creamery business. Paying high wages does not always mean high skilled work, but high skilled work should always receive high wages. We have been able during the past season to make butter containing 42 per cent water. giving an overrun of 62 per cent, without the use of any butter increaser. Butter of this kind. however. does not possess good keeping qualities. The high per cent of water seems to affect the color. giving it a dead appearance. and the butter is short in grain and does not draw out on the trier. The tendency for such butter is to sour after standing some time.

In my experience as a butter judge, I do not believe that I would be able to distinguish the difference in water content of butter between 10 per cent of water and that containing 17 or 18 per cent. but I could readily tell when the water content got up to 20 per cent. Our experiment butter containing 42 per cent was sold on the New York market for three cents less per pound than Western extras. Mr. Healy's comments were that the butter was short grained and would not draw well on the tryer. Now, I do not propose to discuss here any method of working in 40 per cent of water, as I do not approve of making butter of this kind. but I do believe the question of a proper overrun is one of the most important questions that confronts the manufacturer of today. We expect to take up this question at our special short course beginning

January 4th, and will give practical demonstrations daily as one of the specialties of that course. We are getting out a bulletin on this subject, and will be pleased to send it to any butter-makers desiring it. Much of the butter sent to our contest, especially at the beginning, showed that the cream had been churned at too low a temperature, and the butter had been drained too dry before the salt was applied. If you wish a low overrun, or no overrun at all, the best method for you to adopt is to churn at a very low temperature, in fine granules, and wash with very cold water and allow your butter to drain about half an hour or more before salting. Then apply the salt and work for about seven or eight minutes, which will be about the time required to dissolve the salt in the butter.

Now, to get a good overrun you would naturally adopt the opposite methods. Churn at a high enough temperature so that the butter will gather middling soft, but not slushy, churn in large granules and wash with water at about the same temperature as the buttermilk drawn off.

In the churning of butter in large granules or lumps the water seems to be broken into smaller particles and the fat assumes a pasty condition, which gathers up the water and at the same time holds it in such a condition that the working does not remove it. This is seen quite frequently in dairy butter that is churned soft and churned until the butter is rolled up into large lumps. Such butter usually contains 20 to 25 per cent moisture.

Have your salt ready, and as soon as the wash water is removed apply your salt to the butter, and then revolve your churn three or four minutes without putting your rollers in gear. This will thoroughly incorporate the salt with the butter and the moist condition of the butter will soon dissolve the salt. After waiting fifteen or twenty minutes, put the rollers in gear and work the butter about three minutes, or until the salt is thoroughly dissolved and the loss moisture has passed off and the butter has a waxy appearance. Such methods will invariably give a large overrun.

Now, in conclusion I would say that every butter-maker who expects to follow butter-making as a profession should attend some dairy school, as inquiries coming in from the làrge central plants and many other places call for specially trained men. We put out last year some men at $1,200 per year, and we had more inquiries for men at salaries from $1.200 to $1,500 per year that we could not supply. Now this was not because we did not have men, but because we did not have enough men with all the necessary qualifications to go around.

I believe we will accomplish more in the next five or six years in educational work in the dairy business than we have in the past fifteen years. We not only expect to see great changes in the manufacturing side, but milk production must receive more attention than it ever has before, and butter-makers must apply scientific principles if they expect to hold their positions.

DISCUSSION.

C. E. Carr: I would like to ask you, Professor, if you wash with water at the same temperature of the buttermilk this time of year, or warmer?

Professor McKay: I would wash with water at the same temperature as the buttermilk any time of the year. That is, I would churn at a high even temperature so the butter would gather middling soft but not slushy. I mean by middling soft, butter you can take in the hand and squeeze together and at the same time it will not assume that pasty condition which rather soft butter contains.

HOW TO IMPROVE IOWA BUTTER.

M. MORTENSEN, SIOUX CITY.

In no other industry has there been greater progress during the last few years than in dairying. The methods employed by butter-makers ten years ago will now not be recognized by any up-to-date butter-maker. The machinery is different. The butter-maker who at that time was generally chosen from the ordinary walks of life is now a man who has attended school for perfecting himself in his profession Yet the Iowa butter-maker of today comes far from reaching perfection, and in order that we may keep our reputation of making the best butter in the country it is necessary that immediate steps are taken toward making improvement in our system, and that to such an extent that we will be far out of our competitors' reach. An Iowa butter-maker should never be satisfied to follow; he should always aim to be a leader.

Some years ago one of the leading questions at the conventions was how to avoid mottles. This is a thing not frequently spoken of today. The butter-maker, as a rule, now understands the mechanical part of butter-making to such an extent that he knows how to prevent mottles. The question of most importance now is how to make a high and uniform grade of butter possessing keeping qualities. We do not aim to make the kind of butter that used to win sweepstakes a few years ago, as that did not very often possess keeping qualities. The butter now in highest demand is quite different in quality from our fancy butter of a few years ago.

Quality and uniformity are the two main factors to be considered by the butter-makers at present, and for each step he is taking these two factors should be kept in view and be the main centers for all his labors. Some think that in order that such butter may be produced it is necessary that the butter be made in smaller creameries, where all of the territory is within easy reach of the factory. Others claim that the central plants have advantages over the smaller ones in manufacturing butter of that quality, while still others claim that this is easily done in a whole milk plant, but not in a creamery run on the hand separator plan. These various ideas are not really true. We are able to make a high grade of butter under any of these systems, providing the proper methods are adopted. Some of the main factors to be considered in this connection are the condition of raw material, pasteurization and the use of commercial starters.

It was once supposed by a few progressive creamerymen that a first-class butter-maker ought to be able to make good butter from half rotten cream. Later on experience taught us that there is no method by which we can renovate old over-ripe cream or milk and make a desirable product from same. Therefore, it is of the utmost importance that the milk or cream furnished the creamery is in a clean and sweet condition and free from all foreign odors. In order to reach this result it is necessary for the butter-maker to gain some influence over his patrons so that they will receive his instructions and feel that they are benefited thereby. The care of milk on the farm and the relation of the butter-maker to that subject has been so fully discussed at conventions and through dairy papers that it would be superfluous to spare time for that subject at this time.

The hand separator system has undoubtedly within the last years tended toward lowering the quality of the Iowa butter. This is not because the hand separator system is wrong, but because that system is still in its infancy and the methods employed by the hand separator factories need improvement. Similar difficulties were observed the first few years after the factory separator was introduced, but soon the separator system was found to be superior to the old system, and the hand separator system has already proven to have several advantages over any of the previous systems.

When the hand separators were first introduced there were several of their agents that advocated washing of their separator once a day or once every other day. These representatives have nearly all disappeared by this time, which is a blessing to the dairy industry, as such men were not only a disgrace to the firms they represented, but they were trying to tear down that splendid reputation which the Iowa butter has and which it has taken so many years to establish. A cream separator, it matters not whether it is a factory or a farm machine, and all dairy utensils used in connection therewith must be thoroughly cleaned each time they have been used, and if this rule is not followed, then the quality is going to suffer. This has been fully demonstrated by the bacteriologists as well as by the practical creamerymen.

In using care and judgment in our work the hand separator system can be made a success and as good or even better cream can be secured in that way than by the older system, but in order to get the best results it is necessary that the cream is gathered as often as the milk. The one who starts a hand separator factory and recommends that the farmers keep their cream at home until their can is full surely does not have much regard for the reputation of Iowa butter. It is often the fault of the butter-maker or creamery manager that it is so difficult to have the hand separator cream arrive in good condition. They generally oppose the system until they are aware of the fact that they must either accept hand separator cream or close their creameries. Whenever the hand separator is trying to work its way into a certain territory the most sensible policy for the creameryman to adopt is to have the system generalized as soon as possible. This prohibits his patrons from patronizing other creameries. It makes it possible to have routes organized and have the cream delivered as often as the milk, and finally if the creameryman is putting out the machines he will have better opportunity to explain to the farmers how to operate them and how to care for their cream. It is important to remember that cream, especially that rich in fat, absorbs odors and taints more readily than milk and must therefore be kept in a room where the atmosphere is pure. If care is taken in this respect it is evident that a farmer can more easily take care of ten pounds of cream than of one hundred pounds of milk. It takes only a small amount of work to cool ten or fifteen pounds of cream to a temperature of about fifty degrees Fahrenheit, and we all know that the temperature has great influence upon the keeping quality of milk. According to Doctor Conn, the bacteria may at fifty degrees Fahrenheit multiply only five fold in twenty-four hours, while at seventy degrees Fahrenheit they may multiply seven hundred fold.

As soon as the milk or cream has been received at the creamery it should be thoroughly pasteurized so as to check any further activity of the fermentation present. Perhaps there is no way in which the Iowa butter would be improved more readily than by having a State law to the effect that all dairy products must be pasteurized. Pasteurization is undoubtedly going to be the main step toward improvement, and if the State authorities would take this matter in hand and make pasteurization of milk and cream compulsory, then the Iowa butter will gain much in reputation and be in such demand that it ought readily to sell for from one half to one cent above the butter sold from our competitive states, and like the Danish butter, which is noted in Europe for its excellence, so would the Iowa butter be noted in this country as being superior to any other butter produced.

Pasteurization improves the flavor and enables us to make a uniform grade of butter possessing keeping qualities. These are the main qualifications which the consumer or butter dealer expects the butter to possess and as long as there is butter sold these will always be the principal requirements made by the buyer. Furthermore, pasteurization prevents the spread of contagious disease, which is of greater importance than often realized.

The main reasons why the Iowa creameries are so slow in adopting pasteurization are that this operation is considered to involve extra expense without any assurance of a higher return for the product, the butter-makers are often less familiar with pasteurization than they ought to be; they have heard from others that it causes greater loss in the buttermilk and thereby reduces the yield, and that the body of the butter is injured, and of course they are well aware of the fact that in order to be successful in making pasteurized butter it will be necessary to take a term in the dairy school, and this will naturally have some effect on the butter-maker's willingness to accept the new system.

In regard to the extra cost involved by pasteurization, this will not exceed one tenth of a cent per pound of butter where the whole milk is pasteurized with live steam. By a very careful operator this expense may be reduced to one fifteenth or even one twentieth of a cent per pound. This expense can furthermore be reduced by using exhaust steam. In many of the creameries they will be able to do all of their pasteurizing with exhaust steam, and in that case the only expense will be the cost of the pasteurizer and cooler. This expense is very small, and a progressive creameryman cannot afford to consider that expense if it will assist him in improving his product. When we have been able to bring our butter up to a high standard it will soon be noticed by the consumers and they will readily pay a premium on quality.

In regard to the other objections that are made against pasteurization, they are all suppositions without being based upon reliable experiments. We can do just as exhaustive churning from pasteurized as from raw cream. In Denmark they even claim that pasteurized cream gives a better yield than raw cream owing to the butter's ability to retain more moisture. The body of pasteurized butter is as nearly perfect as any produced, providing it is not injured in churning or working.

The cream, however, must be more carefully cooled before churning. It is surely no objection that pasteurization will demand capable operators. A few creameries could well afford to introduce pasteurization for that reason. When pasteurization of milk or cream is introduced pasteurization or sterilization of water used for the butter should not be omitted. At the Iowa Experiment Station they have eliminated several germs from water that cause the butter to deteriorate in quality in a very short time. This makes it evident that the pasteurization or sterilization of water is just as important as the pasteurization of the cream.

Pasteurization alone will not enable us to make a uniform grade of butter, although it is the first step toward it. When the cream is pasteurized, from ninety five to ninety nine per cent of the germs are supposed to be destroyed. Then by adding a good starter we obtain perfect control of the fermentation in the cream, and by always keeping a uniform starter and ripening the cream uniformly we will always produce butter of the same quality. This is almost impossible when the fermentation already in the cream is not destroyed. Without the butter-maker having good knowledge of the preparation of starters and the ripening of cream he will find that pasteurization will be of no advantage to him, but rather to his disadvantage. A good share of our Iowa butter is spoiled because of the butter-maker's ignorance of starters and cream ripening. The starter, if any is used, is allowed to be overripe and in that case it contains active fermentation very undesirable in butter-making. The cream is also allowed to be overripe and the result is similar. The butter made from such cream will have a very poor flavor when fresh and when a few days old it becomes rancid.

The dairy butter manufactured in Iowa surely tends toward lowering the average quality of our butter. It generally has to be renovated before it can be disposed of. It is the duty of every creamery manager and butter-maker to have his creamery operated so successfully that the farmers realize that they can not afford to sell their butter to the stores for from ten to fifteen cents per pound. Iowa is no State for renovated dairy butter. It is pure butter of a high standard of excellence we want. Iowa, the greatest butter State in the Union, can not afford to have its butter sent to New York as renovated butter or as the lowest grade of creamery butter that has to be sent to England where it is sold to the poorest classes of people who can not afford to buy good butter.

Finally, I shall mention another cause of poor butter. There are still a few incompetent men who occupy positions as butter-makers in Iowa creameries. Some of them have never even given their creamery a thorough scrubbing. They do not understand the necessity of cleanliness. They know nothing about milk or how to care for it. A starter has never been inside of their creamery and they ripen their cream in the same way as did the old lady from their home village fifteen years ago. In fact, all they know about creamery work is that they know how to start and stop the machinery providing everything is in running order. If such a man is disinterested in his work he should seek some other occupation. If he is interested in the dairy work, but simply lacks information and training, then the dairy school will be the proper place for him. This is also the proper place for any butter-maker when he finds that he is getting behind and besides that he should aim to keep himself informed by reading dairy papers and experiment station reports.

It is quite natural to blame the butter-maker whenever a creamery is kept in bad condition. The proper one to blame in most cases is the manager, as in the first place he should never hire an imcompetent man. He simply does so that he may save from ten to fifteen dollars per month. He does not realize that by doing so he is losing one hundred dollars per month. Some of our Iowa butter-makers are working under rather discouraging conditions. The average wages paid our butter-makers does not reach sixty dollars per month, and even at that figure some of the directors are continually worrying about how they will be able to reduce his wages. They do not appreciate their butter-maker's work, no matter how well and skillfully it has been performed. The result often is that the same creamery hires a cheaper man. He has perhaps been employed as can washer in some creamery. He knows nothing about butter-making and as a result the quality of the butter from that creamery is impaired. A seventy-five or a hundred-dollar-man is a great deal more profitable than a cheap man. and unless good men are employed it will be impossible to keep up our butter standard.

Even if the creamery has secured a good butter-maker, there are often difficulties for him to overcome. owing to local conditions. In that case we should have experts employed by the State that could assist in solving the difficulties. The State has so far appointed one man. and we do appreciate the fact that they have appointed a man as capable as Mr. Kieffer, but what we need is more of them, and at the same time, as they are instructors, they should have the power to discharge any incapable butter-maker and debar him from a position in an Iowa creamery until he could be recommended by the dairy school. This would surely have a tendency to furnish our creameries with better butter-makers and a final result will be a higher standard of the Iowa butter.

DISCUSSION.

MR. ANDERSON: I would like to ask Mr. Mortenson the cause of the easier incorporation of water in butter from pasteurized than from raw cream. Why is it easier?

MR. MORTENSON: That was not my statement. In Denmark they claim it is easier. You can incorporate more moisture in pasteurized cream butter than in raw cream butter. Without taking into consideration that pasteurized cream really has to be cooled a good deal more than the raw cream in order to arrive at the same result, and I do not believe that is the way we increase our overrun. I think, as Professor McKay has stated, you can get an enormous overrun for either pasteurized or raw cream and pasteurization has nothing to do with it.

MR. ANDERSON: Does this pertain to pasteurization of sour cream?

Answer: No; it does not. What I have taken here is sweet cream. I have not considered pasteurization of sour cream, and if you are pasteurizing your sweet cream and handling it properly, you will not have any greater loss than from raw cream; but you will if you are pasteurizing sour cream, for the difference will not be so great. We have conducted a number of experiments along that line, taking the same cream, pasteurizing some part of it and leaving the other raw, then churned it. From the raw cream we generally got the loss in buttermilk down to .05 per cent, and from the pasteurized the loss about .2 per cent. We find there is always a little more loss in that case, but that was cream containing between thirty and forty degrees of acidity.

MR. GRANT: Do you think you could avoid some of that loss by churning pasteurized cream at a lower temperature?

Answer: I do not believe you could. We have churned it at a low temperature, which took nearly an hour to have it finished, and I do not think you could avoid the loss by churning it cooler.

MR. GRANT: What I want to ask is, do you think you could overcome the loss by churning it cooler?

Answer: I do not believe you can, not in sour cream; because it is natural. You know as soon as it curdles it will incorporate the fat globules and of course does not curdle to such an extent that you will really notice it. Professor Webster has made experiments along this line, and you will find a very fine curdle like flour, but in the ordinary work we have in the creamery we never notice that; but that is the only way that I can account for it, that a small amount of fat globules are incorporated in every curdle and I do not believe a low temperature would be able to reduce that.

MR. GRANT: Do you think there would be any percentage in the difference in the casein in the butter?

Answer: No; I do not. You can incorporate a whole lot of casein if you have a mind to, under either condition. I do not believe there would be any difference, not that I know of, at least.

MR. AUSTIN: I would like to ask if in the churning of sour cream at a lower temperature, the loss would not be greater if you churned a little warmer and incorporated more water.

Answer: By churning warm, as butter-makers often do, you will find you are getting a big yield and you are havng more loss in your buttermilk. If you will follow Professor McKay's advice I think that will solve the whole question. He is churning it cool and thinks he incorporates the moisture that way.

MR. AUSTIN: I did not take it that way.

Answer: That is as I understood it. Then he is receiving the full amount of butterfat out of the buttermilk. He has more to build upon,—more fat, and of course can get more butter out of it that way.

MR. AUSTIN: I would like to ask what would be approximately the temperature we would churn at at different seasons; how many degrees change? We used to consider fifty degrees to fifty-two degrees in summer. How much change would we make from that?

Answer: In the spring, when you have that difficult time, you all know we have churned down to forty-six, and we have had to churn at forty-four degrees. Later we raised it to about fifty degrees; in the fall we got to fifty-two to fifty-four degrees and continue upon that temperature right along. That will always give you best results. You can get your buttermilk clean to .05 per cent, and that is clean churning, and the butter will always come solid.

Mr. Slaughter: Do you think you can use the same churning temperature in all sections of the country?

Answer: Of course not. There are many conditions we cannot account for. There are different kinds of feeds and a number of conditions that I am not familiar with.

Mr. Slaughter: In other words, you could not lay down any specific rule for churning.

Answer: I have never been able to do so. You can get some cream from away up in Dakota and may have to churn that a little different from the central part of Iowa. There are so many conditions that influence that part of it that it is pretty hard to describe.

STARTERS AND CREAM RIPENING.

C. LARSON, AMES.

Members of the Iowa State Dairy Association, Ladies and Gentlemen: Ordinarily speaking, all the different kinds of starters are included under the names, "natural" and "commercial." The latter is prepared from a supposed pure culture of bacteria obtained from the laboratory. The former, or natural, include a great many kinds of dairy products. which are supposed to contain a preponderance of those germs which are involved in the production of desirable flavors in butter. Buttermilk, sour cream, whey and sour whole or skim milk are classed under this heading. While all of these may be termed natural starters, and at certain times the use of any one of them may produce better results than if no starter at all was used, it is not safe to rely upon these to bring about better results than could be obtained without the use of starters, because these products are likely to be contaminated in a large degree with undesirable germs. A good natural starter is usually obtained by selecting a number of different samples of the best milk coming into the creamery into sterilized glass jars. The samples are allowed to sour naturally at about seventy degrees Fahrenheit and the sample which coagulates into a smooth, uniform curd and has a pleasant mild acid taste, is selected and used as a mother starter. When inoculated into a large sample of selected pasteurized milk, cooled to and kept at a temperature of about seventy degrees Fahrenheit, until it begins to coagulate, it will usually produce a starter which is equal and many times superior to a commercial starter.

The discovery of using pure cultures of commercial starters for cream ripening dates back to 1890 by Professor Storch, Copenhagen, Denmark, who found that certain species of acid-producing germs were chiefly responsible for the production of the desirable flavors in butter. Doctor Weigmann, Kiel, Germany, later isolated a species of germ from milk which produced alcohol and lactic acid as by-products, and which, according to experimental evidence deducted by him, was claimed to be largely responsible for the flavors in butter developed during ripening. Doctor Conn, at Storr's Station, Connecticutt, claims that the germs which act upon the nitrogenous matter of milk are associated with the production of desirable butter flavors.

Whether a commercial starter or a natural one is the most profitable for a creamery to use would depend upon conditions. In large dairies the certainty of conditions for getting first-class milk for starters is in a measure removed from the butter-maker. In comparatively small creameries there are usually a few patrons who can be depended upon to deliver good milk, which can be purchased and used for starters.

It has not yet been proven that one particular specie of bacteria is responsible for the production of flavors, but it is agreed upon by all scientists that the flavoring substances are excretion or decomposition products of bacterial growth, and that the lactic acid producing types, are the most desirable ones to have present.

In preparing starters for cream ripening the whole problem is then centered upon excluding from the starter as many undesirable germs as possible and foster the development of the desirable ones.

This fact was recognized years ago by practical men, long before the scientists recommended the use of pure cultures. In European dairy countries, the use of the buttermilk borrowed from a neighboring factory, to add to the cream in order to overcome abnormal conditions, was a common occurrence. In Holland, sour whey borrowed from some other factory, was used in order to overcome gassy fermentation in cheese making. While the reasons for doing this were not well understood, the underlying principle was involved, namely that of overcoming undesirable fermentations by adding ferments of an antagonistic kind, and in that way subdue and in a large measure supplant the action of those undesirable ones already present.

The surest way of accomplishing this and excluding undesirable fermentations from the cream is to use a good natural or commercial starter. A secretary of a large co-operative creamery in the State of Massachusetts one said: "Our quality of butter is falling short; we are not able to produce as good butter as we did a year ago. We have the same butter-maker, and our creamery is running on practically the same plans." When the use of a good starter was suggested as an improvement of the quality of the butter, he objected very seriously on the ground that in the year 1900 they made some butter to be sent to the Paris Exposition. The first lot was made from cream ripened with a good starter and it was pronounced by a competent judge, to be unfit for exhibition. The second lot was made from cream ripened in a natural way and the butter was good, and won a gold medal at the exposition. A poor starter is worse than none at all.

It is evident that at times good butter and even the best butter can be made from the cream without the use of a starter. From cream ripened in a natural way from day to day, a uniform, high quality of butter can not be expected. The quality of butter depends upon the kind of ferments present in the milk and cream, and the kind of ferments present depend upon conditions, such as treatment of cream prior to the time it arrives at the creamery, degree of cleanliness of utensils and purity of surrounding atmosphere. Such conditions, especially when not under the control of the creamery operator, are sure to vary, and consequently the quality of the butter will vary also.

The different experiment stations that have investigated the use of starters have all reported a decided improvement in the quality of cream and butter by the use of good starters. All modern dairies have introduced it as a necessary permanent process in the manufacture of the best butter, and in daily practice the addition of good starters in cream ripening has enabled many makers to excel in competition with contemporaries.

In the face of such evidence the use of starters for cream ripening is meeting with considerable opposition, and perhaps progressing more slowly than its importance demands. The question whether the improvement in the quality of butter will raise the price of it to such an extent as to repay the creamery owner for the trouble involved in the preparation of starters, evidently depends upon conditions. At creamery plants where good milk for starters can be obtained at a normal price and the butter manufactured sold on its merits, the use of good starters has proven to be very essential.

The centralization of creameries, and the changing of whole milk plants into hand separator plants, has in some instances introduced unfavorable conditions for the use of starters in cream ripening. In the first place, milk to use for starters is often difficult to secure; secondly the cream is usually already so sour that further acid fermentation is impossible. Some time ago the head butter-maker of one of those central plants was asked if he was using starters. The reply was, "No, I am more in need of a 'stopper' than of a starter." Under such conditions, especially if milk is difficult to obtain, the economy in using starters for cream ripening may be questioned. If the cream has already developed the maximum amount of acidity when it is put into the ripening vat, acid fermentation can not be started anew by the use of a ripe starter, without the addition of some sweet milk, or by the use of a neutralizer such as bread soda. The addition of a good starter to ripe cream will improve the quality of it by mixing the two together, but that the butter flavors can be developed in the starter and imparted to the butterfat in the cream directly, has yet to be proven. It is generally thought that the process of lactic fermentation in the cream is necessary in order to bring about the desired results

Unsuccessful results by the use of starters for cream ripening have been reported in a great many instances. This can be traced to the improper use of starters. If starters are good they will never bring about poorer results than were obtained without the use of them. Owing to the fact that it is difficult to keep the same starter in a good condition very long many starters are used which develop the wrong fermentation in the cream. A slightly acid, somewhat bitter taste, and a slimy, lumpy condition of the starter are defects which are very common. These conditions seem to be brought about chiefly by overripening it at a high temperature and keeping it a long time at a low temperature before using it. If ripened gradually at a comparatively low temperature and not kept too long, a starter will usually keep in good condition a long time. The Danes, who use starters more regularly than any other people, do not generally cool their starters with ice. They are usually inoculated with about 5 per cent of the mother starter at a temperature of about seventy degrees Fahrenheit, allowed to stand at this temperature for about three hours, then just previous to coagulation they are put into cold water and allowed to cool gradually. This produces a starter with smooth curd and a clean, mild, acid taste. It is kept in good condition and carried on from day to day, sometimes a half a year or more. Nearly always two kinds of starters are kept on hand at the same time, so if one should happen to "go off," the second one could be used in-

In this country, even if special precautions are taken, it seems almost impossible to carry on a starter for half a year without getting a new culture. A starter which has been properly prepared, cooled gradually before coagulation, and not over-ripened, will contain a smooth, soft curd, and retain its mild acid flavor even when carried on for a month. Whenever the slimy ferment develops in the starter it can be noticed in the cream and starter both, by not being able to develop acid as rapidly and to so great an extent. Whenever this particular ferment gains entrance to the cream, it seems almost impossible to develop any more than .5 of a per cent of acidity in 30 per cent cream, while if the proper ferment were present .7 per cent could be developed. A decrease in the quality of butter always accompanies a development of this ferment in the cream.

When the sliminess appears in the starter it is best not to use it. Buttermilk can sometimes be used to an advantage until a new starter can be prepared. The question whether whole milk or skim milk should be used in the prepartion of starters has been argued pro and con, but according to experimental evidence starters prepared from skim milk seem to give better all around satisfaction. A mild, rich acid taste is produced in a starter prepared from whole milk, while the starter prepared from skim milk has lost some of the rich, soft taste, but has a cleaner acid taste. The very fact that a starter prepared from whole milk has a more desirable taste when first prepared is not necessarily an indication that it will produce better results as a starter for cream ripening. From what we now know concerning starters, the ferments which develop in the milk serum are those which are desirable in the production of butter flavors.

It is a well known fact, that just about the time when milk begins to turn sour, that is when the sourness can be recognized by the taste, it has a rather disagreeable flavor. After more acid develops the undesirable flavor largely disappear, and the milk assumes a clean desirable acid taste. The reason for this has recently been accounted for by Storch, the well known authority on starters. He claims to have proven that those disagreeable flavors are due to certain undesirable organisms, developing some acid and a great deal of other undesirable products in the milk during the first souring stage. As the souring proceeds these germs are subdued and gradually crowded out by the desirable acid producing types.

In the preparation of a starter the probabilities are that some of these undesirable types of germs are present, at least it is safer to go on the assumption that they are present. This makes the question of under-ripening of starters just as important to guard against as the over-ripening. Starters which have been under-ripened by cooling too early for several successive days assume a watery, flat, disagreeable taste, and if used for the ripening of cream produces poor results.

Finally a few general remarks as to cream ripening. When a good starter has been prepared there should be no fear that it will produce undesirable results, when added to the cream, provided the proper precautions are taken during the ripening process. The same precautions in regard to "over-ripening" and "under-ripening" are as important in the ripening of cream as in the preparation of the starter. By measuring the degree of acidity in the cream by Mann's or Farrington's test, the proper ripening stage can readily be determined. This will vary according to different percentages of fat in the cream.

The rapidity of ripening depends chiefly upon the ripening temperature and the amount of starter used. According to results obtained by investigators, the greatest relative growth of the desirable germs is obtained at a comparatively low temperature, namely about 65 degrees Fahrenheit. The amount of starter which has been recommended to add ranges between 5 and 40 per cent of the cream to be ripened. Without going into detail the amount of starter to use depends chiefly upon the following factors: (1) the quality of the cream (pasteurized or unpasteurized, fresh or old, thick or thin, good or poor cream); (2) upon the time when the ripening should be completed; (3) upon general creamery conditions. A very large starter has in many instances been recommended for thick cream, but as a rule better results are obtained if a normal amount of starter (from 10 per cent to 15 per cent) is added, together with some of the best milk that can be obtained, and then ripen all of it together.

DISCUSSION.

MR. ANDERSON: Do you mean cream in fat?

Answer: Yes, sir.

MR. ANDERSON: Thank you.

HANDLING AND CARE OF MILK AND CREAM.

J. P. Nielson, Brayton, Iowa.

Care of milk and cream is the subject assigned me by our honorable Secretary. This subject has been treated upon time and again, yet I believe it to be one of the most important questions before us buttermakers today. The demand for high grade creamery butter becomes greater year after year, and as the quality of the raw material delivered us has a noted effect on the finished product, it is evident that the quality of milk and cream delivered at our creameries must be watched closely.

As a rule it is usually the creamery patron who takes good care of of his cows that are most clean with his milk. With this in view, I take it for granted that in handling and caring for milk and cream the cows should first be well cared for.

The place where the milking is done should be clean and dry, and the atmosphere pure, as nothing will contaminate milk more than an impure air coming in contact with the milk, warm, as it is, coming from the cow.

Before starting to milk the cow's udder and teats should be well cleaned so that no dirt of any kind may be left that otherwise would find its way into the milk pail during milking.

The milker should wear clean clothes and perform the milking operation with dry hands.

As soon as milk is drawn it should at once be removed from the barn or milk yard and strained through a good cloth strainer.

If milk is to be separated at home the separation should be done as soon as possible after milk is drawn, and it is more than ever important that the hand separator be set in a place where the air is perfectly free from bad odors.

Immediately after milking or separating the temperature of milk or cream should be reduced to at least fifty degrees, either by running it over a cooler or setting cans in cold water and stirring often to hasten cooling. The quicker it is cooled the better.

The morning and night's milk should not be mixed until both have been thoroughly cooled, and then not before ready to deliver to the creamery. Cans containg milk or cream should be loosely covered and set in a place where they are protected from frost, heat, dust and bad odors. These latter rules should also be followed during transportation to the creamery.

All pails and utensils should be thoroughly washed and scalded after each milking and laid in the sun to dry. Cans should be emptied as soon as returned from the creamery, then cleaned by first rinsing out with cold water, then with washing powder, a scrub brush and warm water. All seams inside and outside should be well cleaned and finally rinsed with scalding water and set out to dry.

If all our creamery patrons would only follow these few and simple rules the butter-maker's task would be greatly lessened and the standard of Iowa butter raised a few points.

REPORT OF COMMITTEE ON RESOLUTIONS.

H. J. NEITERT, CHAIRMAN.

Mr. President, Ladies and Gentlemen: Before reading this report, I wish to deliver a message from Senator Erickson, who was here during this convention and who is also one of the commissioners from Iowa to the Louisiana Purchase Exposition, the dairy exhibit being under his charge. The Senator wished me to announce to the members and people in attendance here that he was much pleased at the sessions and that he would be glad to assist the committee or any one who might appear before the legislature to aid and further the dairy interests of the State, and also to obtain increased appropriation for the dairy department, which is absolutely necessary. He, being one of the members of the district in which Boone county is located, desired me to say that he is a friend to the dairymen of Iowa and will do all in his power to assist them.

I have here a resolution handed me just before the party desiring it offered left.

Resolved, That the secretary be instructed to write to the proprietors or manager of each creamery in the State of Iowa, requesting them to remit the sum of one dollar ($1) to defray the expenses of the "Iowa State Butter-makers' Band," which is to accompany the Iowa delegation to the next annual convention of the National Creamery Butter-makers' Association, and that the same request be sent to each butter-maker of the said creameries.

Motion duly seconded and adopted as read.

MR. NEITERT: I will read the resolutions incorporated by your committee, composed of Mr. Wright, Mr. Smarzo and myself.

RESOLUTIONS.

Resolved, That the members of the Iowa State Dairy Association express their sincere thanks to the city of Waterloo, its citizens and hotels for their generous hospitality and liberal contributions which have enabled this association to hold a most successful convention.

Resolved, That the thanks of this association be extended to the Hon. James Wilson, secretary of agriculture, and the dairy division of his department for the good work being done in advancing the best interests of the dairymen throughout the country, and for the assistance and financial aid given to the National Creamery Buttermakers' Association in their efforts to improve the work of the butter-makers.

Be it further resolved that we recognize in Hon. James Wilson, secretary of agriculture, a true and tried friend of the great dairy interests of this land; that by his unselfish and untiring efforts he has done more to advance the best interests of the dairy industry during the time he has had charge of the national department of agriculture than was done by that department during all the preceding years; and in further recognition of his good work we hereby tender him our most hearty co-operation and support.

Whereas, The practical and scientific investigations undertaken by the dairy department of the Iowa State College of Agriculture and Mechanic Arts have been to the very great advantage both to the dairy interests of this State and of the national as well, and

Whereas, That department has far outgrown the present dairy building and equipment,

Resolved, That this association warmly endorses the proposal of the college authorities asking liberal aid from the legislature of this State for the purpose of erecting a new and modern dairy building and for the establishment of a dairy herd and for the prosecution of investigation and instruction in milk production under practical Iowa farm conditions.

Resolved, That this association commends the work of Prof. G. L. McKay in conducting an educational scoring contest during this year.

Resolved, That the pre-eminence of the Agricultural College of Iowa warrants increased State aid to put all its departments on a basis equal to the demands made upon them.

Resolved, That we congratulate Commissioner of Internal Revenue Hon. J. W. Yerkes and Hon. Leslie M. Shaw, secretary of the treasury, and the President of the United States upon the impartial and satisfactory manner in which the revenue laws concerning imitation products have been enforced by the administration, and hereby express our confidence in them and our appreciation of their honest and fearless administration of the laws which are of such great importance to the protection of our interests.

Whereas, The State of Iowa occupies a prominent and conspicuous position in the galaxy of our Union, and the importance of her great and varied interests demand that she shall be second to none in the part she shall take in the Louisiana Purchase Exposition to the end that the just pride and ambition of her people be fully realized, therefore, be it

Resolved, That we earnestly urge the next general assembly to make a full liberal additional appropriation to the end that the educational, industrial and agricultural interests of this State may be fully represented at that Exposition and that the Iowa Commission may not be embarrassed and hindered in their work.

Resolved, That this association should receive a liberal amount annually from the State for its support, so that its usefulness may be continued and further extended.

Resolved, That we recommend and urge that the next general assembly give authority for the appointment of five assistant dairy commissioners.

Resolved, That we pledge to the National Dairy Union our undivided support.

Resolved, That the association tender its sincere thanks to Mr. Jules Lombard for his fine vocal selections.

Resolved, That we thank the railroads leading into this city for courtesies shown and the granting of low rates for the delegates.

H. J. Nietert,
W. S. Smarzo,
H. R. Wright,
Committee on Resolutions.

MR. KEIFFER: I move the adoption of the resolutions as read.

Motion duly seconded and carried.

THE PRESIDENT: I have a telegram I wish to read. It is addressed to the Butter-Makers Association and was received yesterday, but I held it over for this session because it is the butter-makers' session. It is a matter that we can take no action on, as the constitution provides.

Mason City, Iowa, Nov. 19, 1903.
S. B. Shilling, Care Iowa Butter-makers Association, Waterloo, Iowa.

Secure meeting next year for Mason City, if you can.

A. H. Gale.

I am glad to receive this telegram because it indicates the fact that he will be in sympathy with the effort we are going to make to get an appropriation for our meeting next year.

I have a committee to appoint, the committee on legislation. I have chosen this committee with a view of securing, if possible, assistance from the State for our association, regardless of favoring anybody, butter-makers, dairymen, or anyone else. I deem it necessary to make this explanation to you on account of the way the committee will read.

E. M. Wentworth, Davenport;
H. J. Neitert, Walker;
Joseph Trigg, Rockford;
Frank Dunning, Bedford;
Martin Mortensen, Sioux City.

In Mr. Trigg we have a champion and supporter, an editor whose paper is largely circulated and who took out a membership in the association to be of assistance to you. He has promised us his assistance in farm institute work, and he is the best institute worker in the State of Iowa.

We have also placed Mr. Frank Dunning on the committee. We want a member from the southern part of the State, where we have always been opposed. There is no dairy interest down there, they being all fat stock men and breeders, and fight us all the time. Mr. Dunning is a man who is strong down there and is in attendance at this convention.

There was a resolution adopted by the butter-makers of the Dairy School of Wisconsin to the butter-makers assembled at the Iowa convention, which I received a few days ago, and which are as follows:

Resolutions adopted by the Wisconsin Dairy School Students' Debating Society of 1904, at their regular meeting held November 13, 1903:

> Resolved, That the one hundred forty-one butter-makers and cheese-makers now attending the winter term of the Wisconsin Dairy School at Madison send greetings to the Iowa Dairymen's Association now in session at Waterloo. Be it further
>
> Resolved, That the debating society, organized and conducted by these dairy students, at this their regular meeting, express their appreciation of the work done by the National Dairy Union for the protection of honest dairy products, and we earnestly request that every effort possible shall be made in the future to prevent the fraudulent sale of oleomargarine in the United States.
>
> W. E. Clark, President.
>
> S. C. Thompson, Secretary.

THE PRESIDENT: I want to say one word more to the boys before we adjourn—go home and commence work at once on this appropriation committee. We want at least from fifteen hundred to two thousand dollars, and we will not be satisfied if we cannot get that. Go home and work on the members of the general assembly; see them and see that they favor giving us this, and then we will be in a position to do you more good than ever before.

I have always contended that more credit was due to the Iowa butter-maker than any butter-maker in the United States, for the simple reason that everything they have done has been accomplished without State aid, without any assistance from the State.

I want to impress it upon you to take the matter up when you go home. The members of the legislature are now elected and we are going to work in a systematic way to get hold of every man by letter, and I want you to go after them too. We want that appropriation and we are going to have it.

Is there anything more to come before the meeting? If there is nothing more, a motion to adjourn will be in order.

MR. WRIGHT: I move we adjourn.

Motion duly seconded and carried, whereupon the meeting adjourned.

IOWA STATE DAIRY ASSOCIATION.

MEMBERSHIP.

Name.	Address.
Ashby, M. W	Waterloo, Iowa
Atwood, J. H	Chicago, Ill.
Ahrens, F. E	Waterloo, Iowa
Anderson, A. E	Oelwein, Iowa
Allen, A. R	Dubuque, Iowa
Ahrens, J	Kendall, Wis.
Austin, C. E	Marcus, Iowa
Anderson, M.	Audubon, Iowa
Allison, C. A	Newell, Iowa
Benson, Scott	Dubuque, Iowa
Banta, A. E	Wheatland, Iowa
Burretts, J. F	Cambridge, Iowa
Bristol, G. A	Primghar, Iowa
Beckman, George	Arispe, Iowa
Bergesather, R. S.	Northwood, Iowa
Benson, M. E	Brandon, Iowa
Botterman, D. A	Waverly, Iowa
Borglum, T. M	Rutland, Iowa
Baitinger, John	Ladora, Iowa
Barker, J. A	Monona, Iowa
Bruck, J. N	Fallow, Iowa
Barber, M. L	Marion, Iowa
Brown, F. M	Cedar Rapids, Iowa
Burton, B. F	Waterloo, Iowa
Bair, S. B	Webster City, Iowa
Battern, Charles	Webster City, Iowa
Benson, G. T	Des Moines, Iowa
Beecham, Albert	Waterloo, Iowa
Bagley, F. R	Chicago, Ill.
Ballard, H. C	St. Paul, Minn.
Beecham, Walter	Mankato, Minn.
Blair, G. W	Cedar Rapids, Iowa
Boler, S. J	Iowa City, Iowa
Bischoff, Fred	New York City
Bancroft, H. P	Nashville, Iowa
Buchanan, A. P	Marshalltown, Iowa
Bailey, E. R	Clarinda, Iowa
Barber, A. H	Chicago, Ill.

Baker, E. M	Monticello, Iowa
Bee, William	Fredericksburg, Iowa
Bracy, E. L	Farmington, Iowa
Byrne, G. P	Genoa Bluffs, Iowa
Brunner, Frank	Charles City, Iowa
Bingham, Samuel	New York City
Barney, W. B	New Hampton, Iowa
Brokaw, H.	Rowley, Iowa
Barnum, Duke	New York City
Barkelow, W. S	Clarksville, Iowa
Bowen, George	Mason City, Iowa
Burridge, E. I	Cleveland, Ohio
Bean, E. L	Epworth, Iowa
Beyer, H. F	Edgewood, Iowa
Brant, C. E	Fairbanks, Iowa
Capper, C. H	Alta Vista, Iowa
Carr, Cecil E	Frederika, Iowa
Codner, W. B	Parkersburg, Iowa
Conway, C. R	Garner, Iowa
Chadwick, R. W	Waterloo, Iowa
Casper, F	Guernsey, Iowa
Cochrane, A.	Stuart, Iowa
Crocker, H. M	Parkersburg, Iowa
Doleschal, A. J	Miller, Iowa
Donovan, M. J.	Williamstown, Iowa
Herden, Den	Hull, Iowa
Dawson, J. F	Iowa Falls, Iowa
Crawford, F. J	Cedar Rapids, Iowa
Cushman, J. T	Osage, Iowa
Collyer, W. D	Chicago, Ill.
Carpenter, H. C	Waterloo, Iowa
Cherry, G. W	Cedar Rapids, Iowa
Culp, Thomas E	Liscomb, Iowa
Cherry, W. R	Walker, Iowa
Conklin, J. D	Lone Rock, Wis.
Cummings, J. T	Maynard, Iowa
Remington, A. L	Dickens, Iowa
Ross, J. J	Iowa Falls, Iowa
Richards, L	Forest City, Iowa
Rohrssen, C. H.	Klinger, Iowa
Rye, J. A	Festina, Iowa
Stolberg, Rasmus	Dallas Center, Iowa
Seim, Theo. N	Decorah, Iowa
Stolberg, Knute	Pioneer, Iowa
Schrieber, C. L	Four Corners, Iowa
Savrid, P. J	Huxley, Iowa
Schultz, J. F	Arnold, Iowa
Smith, John S	Preston, Iowa
Sherk, H. A	Grand Junction, Iowa

Smarzo, W. S	Masonville, Iowa
Sorenson, Chris	Wiota, Iowa
Schmidt, J. J	Almoral, Iowa
Spohn, L. J	Delmar, Iowa
Spohn, A. J	Miles, Iowa
Stewart, R. J	Grimes, Iowa
Scott, J. E	Dubuque, Iowa
Stephenson, F. W	Dundee, Iowa
Strait, George	Marengo, Iowa
Squires, B. O	Waterloo, Iowa
Soles, Byron T	Fern, Iowa
Saverraid, R. J	Slater, Iowa
Storvick, T. A	Lake Mills, Iowa
Schrieber, Fred	North Washington, Iowa
Cherry, Howard H	Cedar Rapids, Iowa
Crabb, W. R	Greeley, Iowa
Colvin, W. J	Omaha, Neb.
Clute, L. G	Manchester, Iowa
Cochrin, L. C	Latimer, Iowa
Case, C. L	Chicago, Ill.
Caven, George	Chicago, Ill.
Carver, C. A	Omaha, Neb.
Clancy, P.	Pomeroy, Iowa
Cochonour, F. J	Manley, Iowa
Delstrother, Edward	Waterloo, Iowa
Daly, J. C	Charles City, Iowa
Drysdale, A. C	Dubuque, Iowa
Dunning, Frank	Bedford, Iowa
Dinsmore, Wayne	Ames, Iowa
Daniels, Frank	Grove Hill, Iowa
Dairy and Creamery	Chicago, Ill.
Eliiott, James	Waterloo, Iowa
Edholm, E. S	Dubuque, Iowa
Elder, George A	Chicago, Ill.
Elvidge, A. O	Elkader, Iowa
Erickson, Elov	Mankato, Minn.
Erickson, Senator	Boone, Iowa
Evans, William	Bradgate, Iowa
Erb, R. J	Arbor Hill, Iowa
Elder, C. D	Manchester, Iowa
Enevaldron, M. E	Gilbertsonville, Iowa
Edwards, L. S	Waterloo, Iowa
Forrester, H. E	Fredericksburg, Iowa
Flickinger, L. L	Fredericksburg, Iowa
Frees, A. J	Cedar Falls, Iowa
Frisbie, Jack	St. Olof, Iowa
Flaskgaard, P. C	Storm Lake, Iowa
Feldman, J. B	Dyersville, Iowa
Fisher, F. H	Vilmar, Iowa

Frandsen, A. M	Stuart, Iowa
Ferris, K. B	Chicago, Ill.
Fisher, H. G	Waukon, Iowa
Farr, E. D	New York City
Fairchild, Arthur	Chicago, Ill.
Fullmer, F. B	Ettrick, Wis.
Finch, I.	Fairbanks, Iowa
Grow, Oscar	Osage, Iowa
Graham, E. J	Nashua, Iowa
Grommon, J. H	Manchester, Iowa
Godley, A. P	New York City
Gibbons, Thomas	Elgin, Ill.
Guptill, F. E	Cedar Falls, Iowa
Griffith, N.	Greeley, Iowa
Galbraith, H. R	Sioux City, Iowa
Graham, F. W.	Omaha, Neb.
Geyer, E. W	Storm Lake, Iowa
Gurler, Charles	De Kalb, Ill.
Green, William F	New York City
Goodrich, DeWitt	Goldfield, Iowa
Gude, W. A	New York City
Geyer, E. D	Omaha, Neb.
Gutz, John F	Pomeroy, Iowa
Gibbs, L. J	Waucoma, Iowa
Gehrls, William	Germantown, Iowa
Gudvanger, Erik	Vinje, Iowa
Goodnow, M. J	Collins, Iowa
Gimer, A. D	Cleves, Iowa
Gallagher, James	Toronto, Iowa
Herman, A. J	Maple Leaf, Iowa
Hessel, F. W	Waterville, Iowa
Helfter, C. L	Osage, Iowa
Homan, C. H	Artesian, Iowa
Hicks, O. W	Guernsey, Iowa
Hansen, A. M	Silver Lake, Iowa
Hill, L. D	Humboldt, Iowa
Houghland, A. C	Owatonna, Minn.
Hoff, John F	New York City
Haughdahl, Samuel	St. Peter, Minn.
Harris, J. J., J. B. Ford Co	Wyandotte, Mich.
Hollenbeck, H. F	Waterloo, Iowa
Hauge, K.	Orchard, Iowa
Hohnzbehn, C.	Waverly, Iowa
Hart, C. N	New Providence, Iowa
Hadley, H. R	Zearing, Iowa
Howe, E. F	Omaha, Neb.
Hutton, S. J	Independence, Iowa
Haggerty, P. J	Greene, Iowa
Hummel, W. F	Hudson, Iowa

Hubbell, G. L.	Cedar Rapids, Iowa
Hall, L. J.	Union, Iowa
Hubbard, C. B.	Independence, Iowa
Hopkins, H. H.	Hinckley, Ill.
Howard, Frank	Cedar Rapids, Iowa
Hanson, Edward	Maquoketa, Iowa
Iliff, B. C.	Urbania, Iowa
Jensen, P.	Exira, Iowa
Johnson, A. J.	Graettinger, Iowa
Jorgensen, Soren	Fredsville, Iowa
Johnston, R. W.	Waterloo, Iowa
Jennings, A. A.	Chicago, Ill.
Jetland, G. N. F.	Goldfield, Iowa
Jacobs, F. J.	Chicago, Ill.
Jenn, Peter	Dubuque, Iowa
Johnson, I. D.	Quandahl, Iowa
Kesiter, Charles	Storm Lake, Iowa
Kennan, W. P.	Cedar Rapids, Iowa
Kieffer, P. H.	Manchester, Iowa
Kelly, S. L.	Waterloo, Iowa
Kolarik, Joseph	Chicago, Ill.
Kinsley, R. J.	McGregor, Iowa
Keachie, J. B.	Estherville, Iowa
Kendall, W. L.	Cedar Rapids, Iowa
Kersey, W. T.	New Providence, Iowa
Kelley, George W.	Wilton Junction, Iowa
King, F. F.	Akron, Ohio
Knight, Samuel	Chicago, Ill.
Kennedy, G. W.	Thornton, Iowa
Keachie, James L.	Dexter, Iowa
Kolbert, P. J.	Devon, Iowa
Kindbrug, A.	Dike, Iowa
Kuennen, Ben H.	St. Lucas, Iowa
Kallenbeck, William	Bremer, Iowa
Knudsen, C. F.	Radcliff, Iowa
Knief, George H.	Minkler, Iowa
Koenke, H. C.	Eagle Center, Iowa
Larson, F. L.	Dows, Iowa
Lenius, William	Waverly, Iowa
Larsen, Peter	New Hartford, Iowa
Lisner, Carl	Lake City, Iowa
Landis, T. E.	Farley, Iowa
Languist, G. L.	Saude, Iowa
Ladage, Herman	Buck Creek, Iowa
Laird, S. W.	Walker, Iowa
Lehman, Fred	Coggon, Iowa
Larson, J. P.	Cedar Rapids, Iowa
Lowitz, C. C.	Wyandotte, Mich.
Lillybridge, C. N.	Manchester, Iowa

Leighton, F. A	New Hampton, Iowa
Lambley, P. E	New York
Larson, J. E	Sioux City, Iowa
Little, C. H.	Cedar Rapids, Iowa
Lang, M. W	Washington, D. C.
Lavalle, J. A	New Orleans, La.
Larson, C.	Ames, Iowa
Laughlin, W. L	Osage, Iowa
Lesserman Bros.	Chicago, Ill.
Lauredson, J. E	Pomeroy, Iowa
McElhinney, W. H	Cedar Rapids, Iowa
McVan, E. J.	Chicago, Ill.
McDonald, J. A	Mason City, Iowa
McHenry, Charles	Denison. Iowa
McGinnis, W. H	Waterloo, Iowa
McAdams, Edward	Lincoln, Neb.
McAreavey, J. J	Coggon, Iowa
Marsh, Wilbur	Waterloo, Iowa
Martin, H. C	Waterloo, Iowa
Millard, Frank	Waterloo, Iowa
Mack, W. F	Waterloo, Iowa
Mitchner, E. P	Chicago, Ill.
Musselman, E. N	Sioux City, Iowa
Mitchell, I.	Benton, Iowa
Mitchell, F. W	Cedar Rapids, Iowa
Miller, Frank	Festina, Iowa
Menzres, G. A	Wilton Junction, Iowa
Mallie, Robert	Sumner, Iowa
Mead, ——	Manchester. Iowa
Montgomery, E. E	Williamsburg, Iowa
Miller. M. B	Omaha, Neb.
Mortenson, M.	Sioux City, Iowa
McNary, H. L	Britt, Iowa
McFarlane, E.	Odeboldt, Iowa
McCaffery, J. E	Earlville, Iowa
Miller, H. N	Randall, Iowa
Miller, J. O	Milford, Iowa
Matravers, C. H	Casey, Iowa
Mansager, M. J	Ellsworth, Iowa
Miller, G. O	Cedar Rapids, Iowa
Nelson, Christ C	Exira, Iowa
Nielson, J. P	Brayton, Iowa
Nilson, B.	Swea City, Iowa
Nagel, W. J	Scarville, Iowa
Nelson, Chris	Garner, Iowa
Nichols, S. B	Mason City, Iowa
Nagel, E. L	Deep River, Iowa
Nayfus, Lewis F	Chicago, Ill.
Neitert, H. J	Walker, Iowa

Newburger, J	Chicago, Ill.
Newman, Joseph	Elgin, Ill.
Nelson, P. H	Calmar, Iowa
Owatonna Mfg. Co	Owatonna, Minn.
O'Neill, Ira	Iowa Falls, Iowa
Olson, Adolph	Shell Rock, Iowa
Olson, L. B	Waukon, Iowa
Olsen, A. B	Newton, Iowa
Odell, F. L	Greenfield, Iowa
Paulson, A. G	Rock Valley, Iowa
Palmer, A. A	Manchester, Iowa
Patterson, S.	Austinville, Iowa
Peterson, L. C	Rosendale, Iowa
Pecinovsky, Frank	Schley, Iowa
Pollard, W. K	Thorpe, Iowa
Page, O. J	Woodstock, Iowa
Peterson, Peter	Elkhorn, Iowa
Peterson, S.	New Hampton, Iowa
Putney, C. L	Nashua, Iowa
Purcell, T. E	Chicago, Ill.
Palmer, D. A	Monticello, Iowa
Pufahl, E.	Nora Springs, Iowa
Plumb, H. B	Waterloo, Iowa
Prussing, H.	Chicago, Ill.
Rundall, W. E	Cedar Rapids, Iowa
Reed, S. B	Des Moines, Iowa
Robinson, W. I	Philadelphia, Pa.
Rogers, James	Earlville, Iowa
Rhynesburger, Richard	Pella, Iowa
Rogers, F. F	Fort Dodge, Iowa
Reynolds, Howard	New York
Riddell, W. D	Omaha, Neb.
Rowe, A. M	Vinton, Iowa
Richards, F. S	McGregor, Iowa
Reid, F. H	Dubuque, Iowa
Rathjen, H. M	Marengo, Iowa
Smith, W. J	Waterloo, Iowa
Sudendorf, E., Jr	St. Louis, Mo.
Scott, Z.	Dubuque, Iowa
Shinn, B. H	Waterloo, Iowa
Sandberg, J. A	Waterloo, Iowa
Smith, W. E	Des Moines, Iowa
Schucknecht, E. C	Waterloo, Iowa
Shilling, S. B.	Mason City, Iowa
Stanhope, Joseph	Sioux City, Iowa
Stevens, S.	Spirit Lake, Iowa
Sudendorf, E.	St. Louis, Mo.
Storm, F. H	Preston, Iowa
Shaw, C. F	Tama, Iowa

Shepard, H. C	St. Paul, Minn.
Schupantiz, John	Festina, Iowa
Sheridan, J. F	Wyandotte, Mich.
Stewart, W. J	Grimes, Iowa
Sandholt, H.	St. Paul, Minn.
Sherwin, W. W	Elgin, Ill.
Selway, J. G	Waterloo, Iowa
Thomas, Guy	Goodell, Iowa
Tyler, W. E	Chicago, Ill.
Tabor, W. C	New York City
Tower, W. D	Kansas City, Mo.
Turner, W. E	Mitchell, S. D.
Trimble, N. H	Alden, Iowa
Thompson, S. D	Albia, Iowa
Vargason, E. M	Jesup, Iowa
Van Hosen, James	Omaha, Neb.
Van Camp, J. E	Muscatine, Iowa
Van Auken, E. E	Mason City, Iowa
Wright, Z. L	Cedar Rapids, Iowa
Woodring, I.	Waverly, Iowa
Walsh, F. H	Cleveland, Ohio
Wills, Fred	Knittle, Iowa
Wright, H. R	Des Moines, Iowa
White, H. C	Waterloo, Iowa
Walker, C. R	Waterloo, Iowa
Williams, C. H	Chicago, Ill.
Wescott, N. E	Des Moines, Iowa
Wentworth, E. M	Davenport, Iowa
Wilcox, W. S	Mason City, Iowa
Whitmore, E. J	Owatonna, Minn.
Woodring, F. W	Dubuque, Iowa
Woellert, J. M	Mechanicsville, Iowa
White, E. A	Sioux City, Iowa
Wilson, W. C	Elgin, Ill.
Wood, Andrew	Rockwell City, Iowa
Wilcox, F. F.	Panora, Iowa
Wheeler, N. J	Alden, Iowa
Whitney, A. M	Kesley, Iowa
Welton, F. A	West Union, Iowa
Whalen, J. P	Elma, Iowa
Wood, H. S	Salina, Iowa
Werder, C. H	Monmouth, Iowa
Wick, George	Story City, Iowa
Wallack, R.	Manchester, Iowa
Wedemeyer, J. W	Denver, Colo.
Wendt, H. D	Mangolia, Iowa
Williams, V. O.	Afton, Iowa
Wiese, Rudolph	Prairie Rose, Iowa
Yant, O. P	Manning, Iowa
Zbronik, L. L	Manchester, Iowa

PART VI.

PAPERS ON LIVE STOCK AND AGRICULTURAL TOPICS.

A. BABY BEEF.

THE BEST METHOD TO PURSUE WHEN RAISING CALVES FOR BEEF.

Hon. S. B. Packard, Marshalltown, Iowa.

The "best method" is the quickest and most economical method by which the calf can be matured to the highest priced marketable product. It follows, of course, that the calf must be pushed through its suckling period and on to the age and weight the market demands by a generous supply of appetizing food, such feed as will give the most economical gain in flesh and growth to the cost or value of the feed consumed. To those believing in "baby beef" the proposition will be regarded as axiomatic, so the best method of feeding and handling calves should be discussed.

It being assumed that the greatest gain in weight can be made with a given amount of feed whie the anima is a growing calf. There are conditions involved, such as the convenience of separation of the calf from the cow for the purpose of grain feeding during the suckling period, also the sufficient protection of barns for shelter for late fall and winter calves; and, whether the cream from the milk of the cows is a factor of farm management. Referring to these conditions, it may be said that grain can be fed profitably to calves while suckling; that late fall or winter calves can be pushed to greater weight for age with grain rations than the spring calf, and that skim milk calves can be made into good beef at an early age by proper food and care where the farm separator has a place in the management.

For the suckling calf on grass a ration of corn and oats will do the needful, and for the winter calf before grass a ration of corn, oats and oil meal equal by measure, will answer. The separator calf has not come within my observation, but rich rations to supply the place of the butter fat removed will be needed for three or four months.

Mill stuffs, when prices are right, should have a place when oil meal is not at hand, and when calves are not on grass.

The cost of the grain for a calf on fall milk, up to six months of age, will not much exceed five dollars, the equivalent of twelve and one half bushels of corn at forty cents per bushel.

The weaned calf will thrive better on a ground ration of corn and oats than on dry feed; bran, oil meal or clover hay will be needed up to twelve months, when the calf should weigh from ten to twelve hundred pounds. The cost of the grain for the second six months of the calf will not much exceed fourteen dollars, bringing the total cost of the grain for the year to nineteen dollars; the equivalent of forty-seven and one half bushels of corn at forty cents.

To the grain value consumed must be added the cost of the grass, hay and milk. The grass and hay consumed will not exceed seven dollars, and the milk value can be estimated as being the cost of the maturing of the dam. The cheaper kept cows are those dropping their calves in the spring, since the dry cow will winter on a good coarse ration of rich corn stover, oat straw, millet and cane (sorghum), with stock corn fed sparingly in the coldest weather.

The corn stover and oat straw are waste products on most farms, and millet and sorghum are generous crops for the land needed to grow them, hence the cow forage is cheaply provided.

The cow dropping her winter calf must have a good forage and grain ration until grass, which must be estimated to increase the cost somewhat of the winter calf, but is compensated by the greater gain in the weight for age heretofore mentioned.

The best bred calves with generously milking dams can be made to give one hundred pounds increase in weight for each month of age. Any good calf should go to the market weighing one thousand pounds at twelve months or thereabouts, under good conditions.

As to the shelter in winter, the calf must have a dry pen with yard sheltered from the winds for exercise; if confined in a barn with other stock, great care must be taken that proper ventilation is provided. No gain from the best feeding will be made if the stock is breathing impure air during their confinement at night. Oon't expect the poisoned air to go up the hog shute and escape, but open the doors and windows of the "lee side" (the side opposite to the wind), so the heavy gaseous impurities may by circulation be drawn away.

The number of farms where the cows are milked for the cream are decreasing, the milking chore not being relished by many, so the number of cows that will be kept for product of the calf may be expected to increase in number. There will be no profit in this without cows of the best beef breeds are used, and pure bred bulls used to the end that a quick growing and maturing, and so-called "easy keeping" stock may be bred and raised.

Choice one thousand to twelve hundred pound yearlings now sell at the top. The twelve to fifteen hundred weight steers marketed in Chicago in 1903 averaged $4.90, or $66.15 per head; the average price for all cattle, excluding calves, was for 1903, $43.50 per head; for all of the same in 1902 was $54 per head; with a half million more cattle in 1903 than in 1902, still the total value was less by $30,750,577. A load of Nebraska yearling Hereford steers sold yesterday in the Chicago market, weighing ten hundred and fifty pounds, for $5.75, five cents higher than any other lot on the market. These yearlings averaged $60.37 per head. Had they been brought to that weight in twelve months their cost would not have exceeded $26 for grain, forage and grass, leaving a margin of $34.37 for the milk consumed and the profit. The estimated value of grain consumed, if produced on the farm, will return a profit to the farmer as values are based on corn at forty cents per bushel.

It seems to me that the farmer should grow his bunch of calves for beef, as he does his pigs, around an average of twelve months, to the finish for market. Certainly, the greater profit lies in the direction of rapid growth and quickly to market.

R. S. Johnston, Columbus Junction, Iowa.

This subject is becoming more prominent each year among the cattle interests of the United States. Anyone who reads the market reports of our great beef centers will note that young fatted cattle, or baby beef, always command a good price. There is at least two prominent reasons for a careful study of the early maturing idea of beef cattle.

First. All through what is known as the corn belt land has advanced from fifty to one hundred per cent in the last few years, so that the old method of keeping a cow and raising a calf each year and allowing them to run until three to five years old before being fattened for beef will not pay, therefore other means must be adopted to make this beef in a shorter period and get much quicker returns from the investment.

Second. It has been the custom of a great many of the smaller feeders, as well as the larger ones, to go to the range for their feeding cattle. This will no doubt continue for some time to come; yet the range does not support the cattle it did years ago for several reasons, among them being a large farming immigration into the valley land all over the West, where they make pleasant and profitable homes through irrigation. Again, the sheep owner has taken up a great deal of the original cattle range.

As the result of these conclusions, the time is coming when we will have too look more carefully to the production as well as maturing our own beef. We are convinced it will take very carefuul study, planning and feeding to make a profit in the way of beef only from a cow kept for the calf alone on our present one hundred dollars per acre Iowa land.

But this can be done. We should aim to get as many good high grade cows of either of the prominent breeds as our land would carry, and by all means procure a thoroughbred bull, one with good quarters and good through the heart, or what we term a "beefy looking fellow." Should arrange so that the calves would be dropped in the fall or early spring, being careful to have them as near of an age as possible. If we were aiming for beef alone and did not expect to use the milk, we should allow the calves to run with the dam during the summer on grass, or where they are early fall calves, allow them to follow the dam until cold weather, being very careful to teach them to eat oats and a little chop before cold weather, and still allow them to run to the dam two or three times a day, being careful also to provide them a good warm place during the winter.

It is a common question to hear asked, "How long were they fed?" The proper answer is and should be, "All their lives." The animal that makes the best "baby" beef, and that makes the best profit was never hungry. At the age of six months, as near as circumstances would permit, we should take them from the dam, being careful to have them on a good feed so that the change would scarcely be noticeable or in any way set them back.

As to the feed, in the early age of the calf we should feed largely on oats, adding a little shelled corn, or, better yet, ground corn; gradually increasing the corn and diminishing the oats, and when not on grass, all the timothy and clover hay, with corn stover for roughness, they will eat.

We will not enter into the balanced ration feed, yet would urge the beginner to study all these methods carefully. When the finishing period arrives corn should be the bulk of the feed, with a little oats and cotton seed meal or gluten meal. Care should be taken to at all times have plenty of good pure water at an even temperature.

Keep the cattle as quiet as possible, and the more gentle they are the better they will do. Experience will teach the feeder to carefully note the droppings, the hair and general appearance of the animal to be sure he is properly assimilating his food and in a thriving condition.

Where weighing can be done once a month without too much annoyance to the animal, it is of much benefit to the feeder.

It will be found from these methods that baby beef may be marketed at from eighteen to thirty months old, owing to the early maturing qualities and the success the feeder may have had. We also find that the weights will run from an average of nine hundred and fifty to twelve hundred pounds, more often, however, around one thousand to eleven hundred pounds, and at almost any season of the year will bring a price up near the top of the market.

Our experience is, that any feeder will find some of his calves will go forward and make a much more rapid growth and gain than others. This usually can be traced to the breeding and the milking qualities of the dam, therefore we should urge that a careful pruning out be made each year of the poorest cows, adding new and better ones as it is possible to do so.

At the present prices of all pure bred cattle, we think it advisable for the farmer to purchase in a small way a few good registered cows, as anyone starting in a small way can in a few years have quite a herd of registered cattle. They eat no more, cost but little more, and are surely a joy and satisfaction to any lover of good cattle. After getting a start in registered cattle, the best female should be kept for breeding purposes. The best males may be sold for breeding purposes, but by all odds the majority should go towards supplying the ever growing demand for baby beef. Where the males and females go into the feed lot, the males should be castrated at as early an age as possible and the heifers spayed, and you will find them all selling at the same good price in the markets.

We believe the time is drawing near when the above plans will be followed by a vast majority of our most prosperous corn belt cattle feeders.

E. C. Holland, Milton, Iowa.

I regard the writing of an article for publication on the "Best Methods to Pursue When Raising a Calf for Beef" as quite difficult. There are so many varied conditions under which we have to work that it is extremely difficult to formulate any set rule that will apply to all cases, and under all circumstances that may come up to test your ability to meet the particular case in hand. It is often we have to study the particular case, then apply all the good common sense we have and do the best we can under the circumstances.

The man who cares for the calf should be a *well bred* man; one who has plenty of patience, is in love with his work, and is willing to do it well at all times.

The dam should be in a thrifty condition before calving time, and should be fed some laxative food that she may have plenty of milk for the calf. The calf should have all the milk it wants, being careful to milk what is left to guard against any fever in the udder. It is best to let him remain with the dam as much as possible in his early life, letting him have all the sunshine possible. This treatment may continue for some days, when some nice bright hay should be placed where he can reach it. A little later on a box should be provided to give him a grain ration, which should consist of oats, a little bran and shelled corn may be added to good advantage. Should there be trouble with scours, look after that at once, and give some of the excellent remedies that are advertised, or any of the remedies that are good for a baby are all right here, only in larger quantities.

As he advances let the watchword be *push*. He will soon want a little water in connection with his other food, and be sure to give him the needed sunshine and exercise. After he is about six weeks old it is better to keep him from the dam a part of the time, as he will take more of his feed, which should be given in suuch amounts as he will clean up, not allowing any to remain in the box from time to time. As he advances, don't be afraid to feed with a liberal hand, and with such foods as will make the best growth, remembering that it is growth that we want in his early history.

If he is a good calf and well bred it will pay all the better to push him along as fast as possible. I think it is possible to make him weigh six hundred pounds at six months of age. I don't think it best to do as some people do, to give the best feed to the horses and hogs, and give what is left to the cattle, but give the calf a good chance from start to finish.

Most people know better than they are willing to do, saying, "that will do," when they are far short of the care that is needed to obtain the best results.

As the little fellow grows, which he surely will, and which is a real pleasure to the man who is in love with his calling and loves to take care of his stock, give him what he may want to develop bone and tissue, which feeds may mostly be found on the farm.

A good allowance of oats is splendid for a calf, and if ground, all the better, but the little fellow will gladly do his own grinding if placed within his reach.

Good bright clover hay is also splendid for a calf, especially for winter feed. In the summer season plenty of good grass is all right, but he should have the grain as well, to get the best results.

He should never be allowed to go back for a day, for all he loses will have to be put on again. Always let the watchward be, "keep him going as fast as possible."

As he is nearing six months old it is well to begin taking some of the milk that he may learn to depend upon his own efforts more, taking away the milk gradually that he may not go back any. Someone perhaps will say this may be all right for the record calf but "how about the calf where the owners are patrons of the creamery." Well. that is sometimes a little hard on the calf, and I have known some cases where the calves were almost ruined, and in my judgment a losing game. but someone must milk, and the calf must be cared for in some manner.

Some years ago, when I was a patron of a creamery, I tried to keep the calf going from the start, and I don't know of anything that carries a calf along as well as a part of the milk at least; then give a good grain ration, and push them right along, and not be in a hurry to wean them. In my judgment they should not be taken from the cow entirely until six months old at least. Always remembering that the calf is a machine in some sense, and cannot make beef without plenty of material to work on, and the better the material furnished, the better work it will do. It is folly to feed a calf in such a manner that he will stand still, for then all you feed him is almost if not entirely wasted; so let it be the determination, whether for breeding purposes or for beef, to feed with a liberal hand, and in most cases you will be rewarded in proportion to the care given.

B. STEERS.

THE MARGIN A FEEDER SHOULD EXPECT BETWEEN THE BUYING PRICE OF HIS FEEDERS AND THE SELLING PRICE OF THE FINISHED PRODUCT TO GIVE HIM A REASONABLE PROFIT FOR HIS TROUBLE, TAKING AS A BASIS CORN AT THIRTY CENTS PER BUSHEL.

R. T. St. John, Riceville.

In discussing the above subject it will be necessary to first consider the many circumstances and conditions entering into the problem. We must not reason from the experience and results of a careless and slothful feeder, who would place inferior steers in exposed yards, with cold or pooly ventilated sheds, with little or no bedding, ice water to drink and irregular feeding. Neither can we reason or figure from the experience and results of the professors and students at the agricultural college, because the college fed steer is petted, groomed and cared for individually, with all the comforts possible to bestow, which are not practical for the average farmer and feeder. Neither can we figure from the results and experiences of those who would put thirty-cent corn into inferior or scrub steers.

Our experience and observations will therefore be better understood by taking as a basis the feeder who is a farmer, experienced, thorough and prudent, a lover and judge of good cattle, selecting high grades from any of the popular beef breeds. Cattle to be dehorned, free from blemishes, and free from the vicious hired man who would cause blemishes. To be in good flesh from pasture, reds, roans or blacks preferred. Bunch and place in closed, well-drained yards, with warm, well-bedded, well-ventilated sheds, with fresh water (chill taken off) in yards good troughs that will not chafe or injure stock. Feed regularly, gradually but speedily getting them on full feed. For economic and best results feed in quantities that they will clean up at each meal. Having access to good clover, or clover and timothy hay, water and salt at all times.

One man will feed and care for eighty or one hundred steers. For a bunch of well-bred, smooth, two-year-old steers, the period of finishing will be about one hundred and fifty days. It will take sixty bushels of corn to each steer and about one ton of hay. We would presume that the question does not confine us to a ration of corn alone, and would therefore substitute for about one eighth of the corn its equivalent in wheat, bran and oil meal, which will give better balanced ration.

During the last fifty days of the finishing period, when their teeth become sore and appetites not so sharp, the grain should be ground, either corn or cob meal. For profit, hogs must necessarily follow steers. One hundred or one hundred and twenty-five pound shoat, or lean hog, to each steer. Gain on steers per day each two pounds; gain on hogs per head, two thirds pounds per day.

As the corn is priced at the yard, we must also price the finished steer at the yard, which will be at one cent margin, which would give an even remuneration for interest on money invested and labor performed. In making our estimates we offset the experience of yardage and salt against the value of the barnyard manure that reverts back to the soil to grow more corn.

To more fully illustrate, we will take one steer of the bunch, weight, say eleven hundred pounds; price, three and one quarter cents (the price in this part of the State the present season for choice), and make an estimate:

Feedery steer, 1,100 pounds, 3¼ cents per pound		$35.75
Commission for buying and bunching		.50
Corn, 60 bushels at 30 cents per bushel		18.00
Hay		5.00
Insurance risk 2 per cent		.70
Interest on money invested at 7 per cent		1.05
Labor in care and feeding		2.00
Cost of steer at close of finished period		$63.00
Finished steer's original weight	1,100 pounds.	
Gain during finishing period	300 pounds.	
Weight of finished steer	1,400 pounds.	
Price per pound for finished steer, 4¼ cents		$59.50
Gain in pork, 100 pounds at 3½ cents per pound		3.50
The receipt for finished steer		$63.00

The figures show an even balance. However, we are of the opinion that there is a greater balance in favor of the farmer feeder in the value of fertilizers, as against selling the corn on the market. We therefore conclude that the feeder *should* expect one cent margin, but ought to have one and one quarter cents margin for a *good* investment. However, all he receives over one cent margin adds that much to the glory of the farmer and feeder who owns Iowa land and raises and feeds well bred stock.

J. Elerick, Doud's Station, Iowa.

The cattle business of this country is one of the leading branches of agricultural industry and should be handled in such a manner as to continually improve our cattle by using nothing but pure bred males, thereby giving better steers for the feed lot. The serious decline in the stock market the past year, the corresponding high price of steers the forepart of last year gives us food for thought. High priced corn had much to do with these high prices, but cattlemen themselves did much to help the downward tendency by rushing their cattle on overstocked markets of all grades from canner to the finished steer. The buyers took advantage and stood ready to pound the market on all such occasions. The buyers at the leading markets lay their plans to best succeed in bearing the market by sending news out to demoralize feeders, and the rule is that feeders will let go much quicker on a declining market than on a strong advancing market.

From the very high prices of one year ago, some decline should have been expected, but the farmers themselves have done more to demoralize the market than any other class of men, acting as if they thought there was no bottom to the cattle market, and shipping cattle to market that should have been left at home.

The only remedy that I can see is for farmers to organize and stop glutting the market to help the buyers to demoralize prices. I do not want to be understood that I am in favor of combining to demand unreasonable prices to the consumer, but to only protect the producer in getting a reasonable profit on his product. Is the consumer getting the benefit of these low prices, or are packers and butchers demanding and receiving more than a fair profit?

Chicago appears to be able at any and all times to change the value of the different grades in the twinkling of an eye. When the market is well supplied with good, ripe well matured cattle, the combine makes a leader out of some other grade that is in less supply, and pounds the market on the better grades.

The shipper is a professional that can tell where his cattle will grade. Our export trade has been good all season. The exporters have lined their pockets with that which should have been partially divided among the shippers and feeders.

Lest you may think that I have digressed entirely from the subject assigned me, I will give you my views on the question of feeders and feeding. I consider this a very difficult question—one which depends upon many circumstances. First, quality of cattle. Second, the ability of the feeder to get the best results and knowing how to balance the ration. Third, in economy in keeping expenses down to the minimum. Fourth, in knowing when to ship or to sell. Fifth, in consigning to a good firm that will look after your interest and earn their commission.

In selecting feeders we should always select the offspring of pure bred males, from any of the beef breeds, and regulate the prices paid according to quality. A rough, coarse steer, poor in quality, will consume as much or more in the feed lot, and will not sell within one dollar per hundred where the smooth, mellow-hided animal will sell. Our motto should be fewer and better cattle.

In the first place, let us as nearly as possible compute the cost to the feeder of the finished product:

1,000 pound steer, at 4 cents	$40.00
Interest on $40 six months	1.20
70 bushels of corn, at 30 cents	21.00
300 pounds oil meal, $2 per cwt	6.00
Cost of finished product	$68.20

Sale of finished steer, original cost	40.00
Gain on six months feed, 60 pounds per month, at 5¼ cents	18.90
Gain, $1.25 per cwt, on original weight	12.50
	$71.40
Net balance on finished steer	3.20

In the above computation I do not consider anything for roughness or expenses in feeding, approximating that the profit in the hogs that follow cattle will about pay expenses in feeding and for the roughness fed.

I am of the opinion that the best results come from balancing the ration in the commencement, then not make any change during your feeding period. Cattle learn to relish the kind of feed they are fed on, and whenever you make a change they go off their feed until hunger drives them to eat again. According to my judgment, a feeder should have a margin of $1.25 between the price of the feeder and the finished product. My computation is made on winter feeding. Summer feeding on good grass can be done on a less margin. In my computation I have $3.20 net profit on steer, or $57.60 on carload of steers, this profit includes risks of loss, risks of some steer failing to feed. At any less margin I would rather someone else would do the feeding.

I think the estimate on corn a little low, perhaps thirty-three cents per bushel would come nearer the mark. Many feeders claim that if they came out even on the sale of cattle that are dry fed, the hogs that follow still leave them a nice profit. I certainly think a farmer is entitled to fair compensation for his time, labor and roughness fed to cattle in the feed lot. True, the farmer must have a lot of valuable manure left in the feed lot to be returned to the soil. This belongs to the soil, and if not returned to the soil is robbery, and will cause those that follow us to suffer. Manure made on the land should not be counted as profit, but should be returned to the soil, whose fertility we have no right to exhaust and destroy.

Feeders, let us feed fewer and better cattle. Let us buy only well bred cattle for the feed lot, then our chances will be many times greater in securing a profit from the feed lot.

W. H. Freeman, Oakland, Iowa.

The margin one should expect will depend considerably on his practical knowledge of stock feeding, good judgment in selecting cattle, thorough equipment for the business and skill in selecting a ration which will give the best results in net gain in the shortest time. To convert the raw material into the finished product with the least waste possible, will diminish the expense and widen the margin of the profit, and the practical stockman will see to it that all waste and refuse is saved for its value as a fertilizer.

The margin necessary will also depend to some extent on the class of cattle fed. Most of the cattle fed in western Iowa are raised on the ranches of the West and consequently have to be shipped a considerable distance before they get into the feeder's hands. This handling of the cattle disturbs them both in regard to their habits and feed. The quality of stockers both in "westerns" and "natives" will have a great deal to do with their adaptability to feeding conditions. This difference in quality may reduce the time necessary to fit them for the market twenty to thirty per cent. Cattle that are raised and fed on the same farm will mature for market in the shortest time.

The selection of cattle must depend on the individual judgment of the buyer. No one can buy cattle by rule. This knowledge is born of experience in the business, but generally it may be said that the cattle must give evidence of good breeding, be as even as possible in size, weight and color, dehorned and not too old. It is unnecessary to mention different breeds, as every feeder has his preference, and many varieties are equally good. Shorthorns, Herefords and Angus are the favorites, as they have the essential qualities of build and proportion, namely, wide backs and heavy quarters. The cattle which will yield the biggest margin of profit must be the best quality, which, when finished, will command the top prices. We must continue to improve the quality of our cattle to increase our profits as feeders.

A few suggestions in regard to the care of feeders, both in pasture as well as in the feed lots, may not be out of place. It is a well known fact that the mental condition has much to do with animals as well as man. Let either get restless, uneasy or worried, and immediately they will begin to lose flesh. To avoid this in the human family I shall not attempt to furnish a theory, but with live stock, particularly feeding cattle, they must be kept as much as possible in a good quiet place, with a quiet attendant in charge. This attendant should be patient and industrious, ever looking to tne wants of his charge. They must not only have good food and water, but they must have it at a regular time every day, so that their habits in regard to feeding and resting may not be disturbed. This regularity in feeding soon becomes a fixed habit. The feed lot should not be too close to public places, where strangers and dogs will annoy the cattle. A strange dog will sometimes annoy a herd and disturb their habits for a day with consequent loss in gain.

To be well equipped for the business is an important factor in success. In cold weather cattle require shelter. This shelter may consist of a feed barn, open sheds or a good grove. Cattle that are exposed to storms in the open lot will not eat or rest well, while more food is used in maintaining animal heat. In a good barn or shed, with plenty of bedding, they can always find a warm and comfortable place to rest. It is hard to estimate the value of good bedding, especially a straw stack, in the feed lot. In fine weather cattle do better in the open lot, but in very cold or stormy weather shelter is very essential to avoid shrinkage.

In regard to ration. I believe that corn is the best feed for cattle and hogs. The corn belt furnishes the market with most of the fat cattle and the best quality of beef in the world. A good deal depends on the quality of the corn. In wet seasons, or with early frosts, it is sometimes soft and of poor quality, with consequent decrease in fat-producing qualities. While I believe that corn is our great staple in feeding and that there is no other food product equal to it, yet I have often obtained good results from a little change in ration, such as the addition of a ration of oil meal, bran or oats, which seems to help the digestive functions and aid in giving a good finish to the steer.

The value of good roughage should not be overlooked. Red clover hay is my preference and corn fodder comes next. This roughage aids in the digestion of the stronger foods, as well as inclining the cattle to be more quiet and restful.

The question of margin to afford a reasonable profit is a very important one. All the details can not be discussed in a short article. As nearly every farmer engaged in this industry is a "cattle feeder" and not a "cattle grower," as he must pay cash for the raw material which in six months he expects to have finished for the market, he must take a conservative course to allow for fluctuations in the market and changes in the business and industrial world generally. If he has all the equipment necessary he must realize a reasonable profit on the investment, and as "the laborer is worthy of his hire," he should realize some reward for his work and experience. Granting that the hogs will pay for the labor and roughage, we will take the following table as an average estimate at different market values, taking as an example a steer weighing one thousand pounds, consuming eighty bushels of thirty cent corn and gaining four hundred pounds with six months' feed on a margin of one dollar profit. This estimate does not make any allowance for unavoidable accidents of unprofitable animals in the herd.

Price.	First cost.	Cost of corn.	Net cost.	Selling price.	Market value 1400 ℔ steer.	Net profit.
At three cents per pound	$ 30.00	$ 24 00	$ 54.00	$ .04	$ 56.00	$ 2.00
At four cents per pound.	40.00	24.00	64.00	.05	70.00	6 00
At five cents per pound	50.00	24.00	74.00	.06	84.00	10.00

It will thus be seen that the price of cattle has a great deal to do with the amount of profit.

To summarize briefly then, the feeder must be reasonably sure of a margin of from one dollar to one dollar and fifty cents, depending upon above conditions to realize a reasonable profit for his trouble.

BUYING STEERS FOR THE FEED LOT.

A. L. Ames, Before Black Hawk County Farmers' Institute.

The best method of buying steers for the feed lot is a problem never solved, and is always new and of vital interest to the feeder. The old adage, "An article well bought is half sold," was never better illustrated. When? How? Where? What kind? What weight and what price? are questions that should be thoroughly settled in the mind of the prospective buyer. I wish to call attention to a few necessary and important points to be observed before attempting to secure the cattle.

In this age of change and if you will progress, when the tendency of every industrial department is toward combination and centralization, in this land where labor rules and where unions are more powerful than law, religion or right, where the successful man in every business department devotes his whole energy and thinking being to the perfection of some one idea and to prove to the world its value, the farmer, feeder and stock man is expected to take his place.

In order then to buy well a drove of cattle for the feed lot he must know something more than cattle. There must be long, hard hours of study over the industrial problems of the day. The reason why he feeds being his desire to sell beef at a profit, it becomes necessary for him to study the future prospect of the market. He must be well posted on the number of cattle relative to other like periods that are going "on feed" at the time he expects to start his. He must know to a certainty the power or feeding value of the feed he is to use and its cost per hundred weight when ready for the cattle. He must also be reasonably sure of the pounds of gain to be made during the feeding period by the use of this feed. He will then know just exactly what he can take per hundred weight for his cattle and not lose on the investment. He also has the advantage of knowing at all stages of the feeding period the actual cost of the cattle up to date, and can take advantage of a profit should the proper inducement present itself. To all of these questions and many others should the feeder give his best thought and study before deciding to feed.

It would be impossible in one article to speak of all the different methods or combination of circumstances that must inevitably arise and can only be settled by one person, and he the originator of the plan. I will therefore confine myself to a few general principles that I have found useful in buying all kinds of cattle but more particularly those to be used for the "dry lot" or placed immediately on full feed.

The first and most important point to be decided by the buyer is the class of cattle to buy. This question should be settled at home before any attempt is made to find or purchase any cattle whatever. Only those of the same class, age, weight, and breeding should be fed in the same yard. A mixed drove of big and little, rough and smooth, well-bred and scrubs, do not feed so well nor sell as well as though they were all of the same kind. Having fully determined this point, do not allow your judgment to be overruled by what the other man is doing. A good axiom to follow is to "Buy when the other man wants to sell." You can then get your money's worth. The kind or class you buy will depend largely upon your surroundings and the time of year, but you will certainly take those which in your judgment will make you the most money. In order to determine this we find four factors, three of which are known: the cost price, the feed bill, and the average gain per day or ratio between feed and gain. The fourth member of the equation is more uncertain and at times very difficult to control, namely, the selling price. If this were known the solution would be easy, but, as many of us can testify, such is not the case.

In the selling market are four well defined grades of beef cattle: the choice, good, medium, and poor. In one of these four market divisions the feeder must place his finished product and his profit or loss be estimated from the price obtained. This being true, it will be well to examine these divisions a little as a help toward selecting your feeders.

In the division of choice cattle you will find only the very best bred cattle—those as good or better than registered stock and always a selected bunch and fed to a finish. They must be prime in every way—in breeding, style, finish, flesh, fat, form and weight. Cattle that occupy this exalted place on the market are as a rule bred and fed by the same individual and pushed from calfhood up, and so need not be considered at this time. In the next two divisions come the bulk of the cattle sold, the principal difference being a matter of flesh and finish, the medium cattle covering a wider range and not dressing out quite so large a per cent when slaughtered. In the poor column a feeder should never be found, for they are invariably money losers. A person can hardly be called a feeder unless he can make a medium fat steer out of a poor stocker.

We find then the large majority of feed yard cattle are sold on the market for what are known as useful cattle, and to make these cattle with least possible expense is the business of the feeder.

It is impossible to say where to buy your feeders, for if any one place were known to be the best we would all try to be there at once. There is, however, a growing tendency among buyers to use the market centers for this purpose, and on the whole it is a good plan with many points in favor. You can get what you want and just when you want it. Have more to select from, and, therefore, an evener bunch of cattle. It takes less time and may not cost any more. There are drawbacks to this method as well, and not every man can be sure of getting just what he was looking for the first time he tries. A word of caution may not be out of place.

Cattle will look different confined in a close pen than at home in a large yard or open field. There is more danger of overlooking some physical weakness in the short time you have made up your mind or not to buy.

You may not have the right valuation of the cattle you are looking at. A countryman is often known by his impetuosity. Don't be in a hurry. You have more time than money at your disposal just now. The cattle may be in no condition to buy at all for the reason of an extra fill. You can supply water at home cheaper than you can pay for it there. Sixty pounds of water make a very material difference in the gains you make during the feeding period.

If you do not feel entirely competent to buy for yourself, go to some reliable commission firm to help you select the cattle, buy them for you and see they are properly loaded on cars. Nine times out of ten it will be money well spent. If you are buying in the country the same points are to be observed, but it will be necessary to use more care in order to secure cattle of the same class. I would say, then, buy the kind of cattle you need as cheaply as possible, and never buy water. Throw out all undesirable steers such as weak legs, backs, lungs, lump jaws. Buy only those with good back, head, legs, and digestion, and it will be your fault if they do not fatten.

FEEDING CATTLE, AS A PART OF GENERAL FARM OPERATIONS.

John Fox, Dallas Center, Iowa.

Except in a few locations, near to cities, and localities where the demand is such as to make it more profitable to devote the land to fruit and vegetable gardening, and such can hardly be classed as general farming—the question of keeping cattle on the farm admits of but one answer. If the fertility of land is to be kept up the keeping of stock is a necessity; this, of course, admits the whole range of domestic animals, each having its especial adaptation to local environment.

In the great corn and grass belt of Iowa, where the writer lives, cattle and hogs seem to be peculiarly adapted, and in the thirty-five years of practical experience I have found the rearing of cattle and hogs, the milking of cows, and the special business of feeding steers, together with hogs, reasonably profitable.

My experience has been that the milking of cows and the raising of calves and hogs has proven most profitable on the smaller farms, there being less of the speculative element in it than in the purchase of steers and hogs and fattening them; but earlier success leads to larger holdings and the detail required for dairy farming is harder to follow out on a large scale, and an entirely different proposition is met if one makes the change to feeding for beef and pork. Many things come in for consideration, on which may depend success or failure.

To begin I would say, go slowly until you learn what you can reasonably expect to do with a given amount of feed and fair animals, depending largely upon the feed produced on the farm until you know what you can reasonably expect to produce under given conditions, then with a knowledge of cost of production you are prepared to make a fair estimate of what you can pay for feeders and feed. But, be sure you do not discount the future buying your feeders, expecting a raise in the price of the finished article, for in a series of years there is sure to be as many declines as advances, and if others seem to see great things ahead, and put up prices on stockers where an advance on finished beeves must be realized to make a profit, do not abandon the business altogether, but put in fewer cattle and more hogs, as a few cattle with a number of hogs to follow will rarely ever cause a loss.

I have known of a number of failures made by parties who seeing the apparent success of some large operator, think that all that is necessary is for them to get an advance from the bank, buy the cattle and the corn, and lose in a single year the savings of several, where if they had begun slowly and increased their business by degrees they would have made a success.

For a beginner, I would recommend a few steers, say eighteen or twenty, in order to have a carload. As to quality, that would depend on the cost, but for a single carload I would want them of fair quality as nearly even as possible in size, and from seven to eight hundred pounds weight. If I had plenty of grass would buy in September, getting the benefit of two months' pasture in the fall, being careful to supplement it with a small feed of snapped corn through the month of October, keeping them to a steady growth of at least fifty pounds per month. Having for the carload of cattle from fifteen to twenty acres of corn cut up in shocks, should begin to feed shock corn a number of days before I was ready to turn into the stalk field, getting a portion of the field husked as early as possible to have the use of the stalks in the best condition, which in central Iowa ought not to be later than November 1st. I would then turn them in on the stalk field a few hours each day until the cattle had most of the corn picked up, and then begin to add corn to their feed with oil meal, beginning the oil meal at the rate of a pound per day to the steer until all were accustomed to it, when I would give at the rate of two pounds per day until well on grass. Have never found it profitable to feed more than two pounds in connection with corn, as corn is the cheapest of all feeds for the bulk of the ration.

When the stalk field was well picked over I would increase their feed of snapped corn held for the purpose so long as there was any profit to be made by keeping them in the stalks, after which I would feed shock corn in quantity to give each animal about one peck of corn per day; feeding on the field if frozen and dry; keeping hogs away until the cattle are done feeding. If muddy, would feed in racks, throwing out refuse to make bedding and to provide a foundation to keep them out of the mud. In the spring have at times raked stalks off the field into the yard for this purpose. Handled in this way, I should expect the cattle to gain from forty to fifty pounds per month during the winter, owing to weather conditions, thrift of cattle, comfortable quarters, and particularly good breeding, and plenty of good water to which access should be had at all times, as well as salt.

On May 1st we should have cattle weighing between one thousand and eleven hundred pounds, and in prime condition, for four months further feeding.

To change from dry feed to grass without loss is another difficult problem. I used to think I must save my pasture from early tramping, but except in case of clover do not think it really necessary, so let them run part of the day as soon as there is any grass, being careful to keep them to their feed until there is grass enough to answer for roughness. If clover pasture, keep in yard until the stalk with the shape of the head for bloom appears, which will ordinarily, in central Iowa, be about the tenth or fifteenth of May. Would let them into the pasture but an hour or two in dryest part of the day, for at least a week, when they will go right along and eat from a peck to one third of a bushel of corn per day. If I wished to crowd them, and corn was reasonable in price, would give them all I could get them to eat up clean. If corn was high, should give not more than a peck per day, and feed longer. With the full corn ration the middle of August or September first they should be fairly well finished, and weigh from thirteen hundred and fifty to fourteen hundred pounds. This would give for the year's feed six hundred to six hundred and fifty pounds per head.

Now would it pay? I can only say that for a number of years farming operations carried on as above described has satisfied the writer fairly well, particularly in increased productiveness of the land, having fed from one to twelve cars per annum covering a period of thirty years in central Iowa.

The best answer I ever heard as to "pay for feeding" was given by an English gentleman in relating the experience of a younger brother who had been provided for by the purchase of a commission in the army in connection with the commissary department. He sold his commission, returned home and began farming. His army training made him very methodical in his accounts, so he held each department of the farm to a strict account. He found that, though the farm as a whole paid, the largest profit was in wheat and smallest in the feeding operations, so the feeding operations were given up, and more grasses plowed up. For a year or two all was well, but the first bad season showed less profit, and for a series of years each season showed less profit. When he again took up feeding he found the general profits of the business to increase. So I think it is largely with cattle feeding; it is hard to take the price of corn, pasture and what you pay for feeders, put them together and show a profit, but judiciously managed, most of the feed being grown on the farm, taking a series of years, will be found profitable and worthy of attention, as is proven by the success of many farmers in central Iowa.

THE TAIL OF THE STEER.

Breeders' Gazette.

"Say, 'Feed-Box,' I never told you how I came to buy that other eighty for Steve, did I?" It was in the late summer or early fall, when for weeks the wind had blown unceasingly from the southwest. The Kansas highways, as straight as the surveyor's chain could run them and flanked on either hand by the waving, nodding thickets of yellow sunflowers, were an endless and almost bottomless trail of gray dust. Essentially

"It was the time when breezes blow,
When clouds are high up in the air,"

for the horizon seemed unattainable, the sky to extend to heaven itself and the southwest wind never-ending. It was also the season of the ripening corn and plans for winter and when men buy calves and steers and talk steer at home, in town, at the neighbors' or on the road between.

Tom and I were going over to inspect a bunch of steers that had been lately shipped in from Kansas City to a neighboring feed-lot, when he made the remark with which I began. Now it is not the custom in Kansas for a man with a mortgage on his own homestead to buy land and present it to his neighbor any more than it is elsewhere. I knew Tom was at all times truthful, never given to romancing, hoaxing or anything of the kind, but how a man with his own home mortgaged to the limit, often compelled to buy even his chewing tobacco on long-time credit, forced in every autumn to sell the corn that was really needed to carry his stock through the winter, whose taxes were often paid in part at least by the sale of hides from cows or horses that died simply from the lack of feed—how such a man as this was to buy an eighty and give it to his neighbor scotfree astounded me so that I could not ask even a single question. Doubtless Tom read my amazement, for he continued:

"You see that was the year we had the F. M. B. A. down at the schoolhouse. Steve and I were elected delegates to the county convention that met down at Sola. It was on Saturday and I walked up to his place and rode to town with him. It was along the last of August and we were just gathering out our first corn to feed the hogs. Steve's corn was turning out about a crop and a half and mine on the bottom was still better. We were talking about feeding steers on the way to town. I knew the bank would let me have money to buy the steers with if only I could stand that mortgage off a while, for the year's interest had to come out of the corn. I was telling Steve about it, but he didn't talk much, only listened, and didn't seem to take much interest. But two or three weeks later he drove to my place one afternoon. 'Say, Tom," said he, 'are you going to feed any steers this winter?' I told him I couldn't, for I had just got a notice from the mortgage agent that all my back interest would have to be paid up at once. After a bit he said:

" 'Tom, do you think a man can go into a bunch of steers when they are all poor and pick out the ones that will be the best feeders?' 'Sure,' said I. 'How?' 'By the tails.' 'Tails?' 'Yes, tails.' 'Why,' said he 'how is that?' You see, he had been over among the New Yorkers on Elm Creek and the English up on Rock Creek and he had heard all about picking the steer with a bright eye and a waxy horn, or a short, wide face, or for a wide chest, or for short legs, and all that kind of rot that the old feeders fool away their time talking about. But he had never heard about a steer's tail having anything to do with the way he feeds out. 'Well,' said he finally, 'would you mind getting in the spring-wagon and riding around with me this afternoon?' I got in and the first bunch of steers we saw he asked me to show him what I meant. I picked out five or six steers that had the right sort of tails on them, tapering tails, you know, tails in which the bone is no larger than the bone of your little finger down next to the brush, but is as big as your arm up where it joins on. Pretty soon Steve thought he had found another tail that was just right, but I told him no; that the brush was too long and that a long brush usually meant a wild fool steer, and it always meant a slow-feeding steer. Finally Steve said:

Prize winning coach horses as seen at the Iowa State Fair of 1903.

"'Let us try this thing once. You pick out the steers that you think are right and don't take them unless they are right.' Well, nobody thought we were trying to top their steers, and so in a few days we had them all bought, and when they were all bought and all gathered up it was just the kind of a bunch that my grandfather used to buy up in Tennessee and fatten for the Baltimore market over eighty years ago.

"Steve had stacked all his hay in great big long ricks in the feed-lot and built a manger around them. As soon as we had the steers bought he said to me: 'Now, I want to buy your corn,' so I had my corn shelled and hauled it up and filled those big self-feeders that he had built for shelled corn out in the feed-lot. Just then Steve took down sick. Well, I had picked the steers for him and had sold him the corn to feed them on. His wife salted them, the windmill pumped water for them and I went up every two or thre days and put out hay for them. Steve did not get out of bed from the day he had me open the self-feeders until the day we loaded up the cattle for Chicago. His brother signed his note at the bank to buy the cattle and buy the corn to feed them. When Steve got back he squared the notes. Then he sold a pair of horses for one hundred and thirty-five dollars—they would be worth four hundred dollars if he had them now—then his wife chipped in some butter and egg money that she had been getting ahead of their grocery bill for two or three years before. He still lacked about four dollars of having enough to pay for that eighty acres. He told me himself that he got that four dollars by "hitting" the children's toy banks. But of the two thousand dollars that went to pay for that eighty I made over eighteen hundred dollars for him, so I say that I just made him a present of that extra eighty he has over across the road."

This was some twelve years ago. At that time Tom was already one step in advance of his mortgage, that dread fiend that had for years pursued him so closely, had starved his poor dumb brutes to death and deprived his family of even many of the absolute necessities of life. But at that time his interest was arranged for one year in advance. The next fall Tom was buying a bunch of steer calves. Since then he has prospered like the proverbial bay tree. At last he was able to do what only a rich man can do and only a foolish man would do; he has moved to town and is trying to be happy while doing nothing. His money is now a main pillar to the bank where he once entered with fear and trembling. In the big farm house which he built on the corner of the square his daughter to learning to drum on the piano, that she may some day be able to take an active part in city society. Perhaps in her dreams she may aspire to have that soda fountain tender with the football hair for a steady caller or of ending a long career of social successes by becoming the helpmate of the local Beau Brummel, a shoe clerk, who on the princely salary of twelve dollars a week is the dictator of local society. So much for the tail of the steer. If last is it not yet foremost? If weak, has it not power?

CHALLENGER'S FEEDING.

H. R. Smith in Breeders' Gazette.

There has been considerable inquiry concerning the feeding of Challenger, the recent International graud champion steer, the details of which are herewith presented.

The Department of Animal Husbandry of the University of Nebraska has no secret methods of feeding or fitting. The public is welcome to any information concerning the feeding of Challenger which may be useful. While it is not considered practicable to carry all animals to Challenger's degree of finish, the ration given him can not be criticised for being an unduly extravagant one, as the record will show.

First of all, Challenger was raised by hand on skim milk. The breeder, Lawrence Murphy. who was also his feeder until May 1st. last, never gave him any preference because, as he says in a recent letter, "we noticed nothing in him to give him a preference." He was given an abundance of grass in summer, and corn, hay and corn stalks in winter. When first seen by the writer last April he was in the open lot with about fifty more of his own size. He was being fed corn on the stalk, shelled corn and prairie hay.

Challenger's record in the Department of Animal Husbandry of the University of Nebraska begins May 6, 1903. On that date he weighed 1,275 pounds on feed and water. May 20th he again weighed 1,275 pounds. The change in surroundings partially explains why there was no gain between these dates. His later weights were as follows: June 20th, 1,355 pounds; July 20th, 1.4430 pounds; August 20th, 1.525 pounds; September 20th, 1,565 pounds; October 20th, 1,700 pounds; November 20th, 1,825 pounds. From May 6th to November 20th, six and one half pounds, he therefore gained 550 pounds or an average gain of two and three-fourths pounds per day. For a steer of Challenger's age and flesh this was a remarkable gain for a summer period of that length.

May 6th he was started on a ration consisting of 60 per cent corn, 20 per cent oats, 10 per cent bran and 10 per cent oil meal. September 26th his ration was changed to 50 per cent corn, 20 per cent oats, 10 per cent bran and 20 per cent oil meal. October 17th the bran was cut out and the oats increased to 30 per cent to counteract the laxative effects of 20 per cent oil meal ration. November 7th, for the sake of variety, three pounds of ground wheat was introduced. He was then under extremely high pressure feeding, consuming twenty-five pounds of grain per day, besides a few pounds of sugar beets and about eight pounds of alfalfa and prairie hay.

Challenger was kept in a cool shed away from the flies during the hot weather in company with two Angus steers of his own age, one of which won third in the college class and the other second in the carcass test.

The feed for each meal was weighed out for the three together and the herdsman divided it among them as evenly as could be estimated.

The average amount of feed consumed by each was as follows: 2,276 pounds of corn meal, worth $14.80; 613.5 pounds of oil meal, worth $6.90; 314.3 pounds of wheat bran, worth, $2.04; 878.9 pounds of oats, worth $8.23; forty pounds of ground wheat, worth 40c; 100 pounds of sugar beets, worth twenty-five cents. Total grain, 4,222.7 pounds, worth $32.62.

We gave Challenger no condimental stock food, prepared sugar or cooked feed.

His total cost to the university, not including freight and labor, foots up to $105.72. Had he sold for only six and one-quarter cents per pound in Chicago he would have paid out. As it was he won $430 in prize money and sold for twenty-six cents per pound, bringing in all $879.80.

No grand champion was ever produced without being well fed. On the other hand, not all well-fed animals can ever hope to become champions. There must first be that conformation of body and inherent assimilative powers which make possible a rapid formation of flesh and a flesh placed evenly and thickly over those parts which command the highest prices. Barring a little lightness of flank, Challenger was excellent in conformation even in his 1,300-pound form. Had he not been good in conformation, with a hide showing every indication of thrift, he would not have been taken from the herd of the original owners and shipped some distance to the university farm, the sole occupant of a freight car.

He has been called a scrub, which some people have used as an argument against good breeding. This is an injustice to Challenger and the breeding interests of the country. Challenger was not a pure-bred, but he possessed not less than 75 per cent of the blood of two most excellent beef breeds. His mother was a Shorthorn cow with enough Holstein blood to give her a blue-white color. It does not take much for that. She is quite ordinary in appearance. Challenger's sire was a registered Hereford bull of unusual individual merit. Challenger was a powerful example of what good pure-bred sires can do toward grading up common stock. This is the real object of all pure-bred breeding—the production of sires for the common stock of the country. The pure-bred is far more prepotent in transmitting characters to offspring than is the animal of mixed breeding. The little Holstein blood in Challenger's veins manifested itself in the blue tinge to his coat and his wonderful assimilative powers. He had many characters of the Angus in his well-rounded hips and evenly-curved back, but no trace of Angus breeding can be found. His horns were sawed off when young.

Challenger was sold to Dunning & Stevens, East Buffalo, N. Y. He was later purchased by Mr. Klinck, a meat dealer in Buffalo, who slaughtered him for exhibition, December 20, and afterwards presented him to the Buffalo Orphans' Asylum.

Challenger dressed 1,135 pounds of meat, or 65.6 per cent of his live weight. A letter from Dunning & Stevens states: "A portion of all four leg joints and tail were removed with the hide by the taxidermist. Our experts here think with a fair weighing test he would have made 68 to 70 per cent of beef. He made a magnificent carcass of beef, by far the best our cattlemen had ever seen, and you should feel proud of your effort and encouraged in your work."

Challenger is being mounted for the St. Louis Exposition Commission to exhibit at the World's Fair next summer, after which he is to be returned to the University of Nebraska for class-room illustration.

University of Nebraska.

C. HORSES.

BREAKING AND FITTING HORSES FOR SALE.

John Buckler, Herdsman Iowa Experiment Station, in Wallace's Farmer.

The horse has always been recognized as man's closest companion, and it is a question as to whether the man ever lived who did not delight in driving or riding a good horse. This subject is of particular interest to every man who raises or handles horses. An old saying is that eggs and colts are much alike, for they must be broken before they can be used. The proper breaking of a colt determines in large part the future usefulness of the horse, and no man who has dealt in horses and experienced difficulties in their management will deny that there is much room for improvement in that line. Every day brings fresh illustrations of improper breaking. Less than a week ago a man drove down to the experiment station barn, driving a horse that had been handled for over two years that had not yet been taught to back. This is only one of the many similar cases.

Besides the losses resulting from improper breaking, thousands of dollars are lost to the farmers of this State every year by selling horses that have not been properly fitted for sale. It is a comparatively easy matter to fit horses for sale, and it can be done without taking them from their regular work, while to the farmer it means an increased return of from fifty dollars to one hundred dollars per team.

In breaking, the first thing to be considered is the nature of the horse. The dispositions of no two horses are exactly alike. As a rule there is a great difference in the dispositions of native and western horses. The native horse is much easier broken, not requiring so much time, but when a Western horse is thoroughly broken there is none more reliable. There is also a great difference in the draft temperament and those more highly bred, such as trotting and coach horses, the former requiring much less preparatory handling than the latter.

After studying closely the disposition of the colt, the next step is to halter, and in this, as well as all other periods of the breaking, the person in charge should exercise a great deal of patience. The colt should be gotten into some shed or box stall, preferably one with a ground floor, so there will be no danger of slipping. Now, with halter, to which is attached fifteen feet of rope, gently work around the colt, caressing him as much as possible, so as to win his confidence, and when he sees you are not going to hurt him you can usually put the halter on without any trouble. Now, presuming this colt to be one that will pull on the halter, take the loose end of the rope and pass it through a hole in the manger or around a post, back between the fore legs, around the girth, and tie. The colt is now tied by both head and body. Step back and let him fight it out, which will take only a short time. And when tied in this way there is no danger of injury, as is sometimes the case when tied by the head only. As soon as he gives up pulling go to him and caress him, and by so doing give him to understand that you are his friend. It is well to leave him tied for some little time, after which he may be led.

Now, leading is a very important part. A horse well broken to lead is more attractive, easier to handle, and will command a higher price in the market than one that is not. In training to lead, always teach the colt to walk beside you and never allow him to follow along behind, as is often done. This can be done by taking a whip in the left hand and touching him up a little from behind. A few lessons of this kind will teach him that the proper place for him is beside you and he will not want to be any place else. After being well trained to walk beside you, encourage him to trot. This can also be done by the use of the whip. It is well to have the lead shank in the mouth of the colt so he will not get away from you. In leading, keep the colt's head well up so as to make him look attractive and stylish; also keep his head as straight ahead of him as possible. Do not make the lessons too long or tiresome, as short lessons, and often, are much better.

After the colt is well broken to the halter so he will show to good advantage, the next step is to get him used to the bitting harness. This consists of an open bridle with check, surcingle, crupper, and side lines, which go from the surcingle to the bit to prevent him from turning his head to either side. Put this on him and check him up, not too high at first, but raising him a little each day untill the desired height to make him look attractive. For this lesson let him have a yard to go about as he pleases. When well accustomed to the bit and check put on long lines instead of the short side lines and teach him to drive, start and stop at the word, also to back. This is a very important part of the breaking. It is very easy to train a colt to back, but you must not get in too big a hurry or failure will likely be the result. Encourage him to back a step by pulling on the lines, at the same time telling him to back. As soon as he makes a step backwards, slacken on the lines and say "Whoa." Repeat this until he will back when told, which will take but a short time if properly done.

The next step is to hitch in harness. This may be done either single or double. If single, they should be hitched in some kind of a breaking cart. This need not be one bought at a high price, but can be made by using two wheels of a light wagon with an axle to which attach two poles to act as shafts; arrange a seat, and the cart is ready for use.

This may not look very nice, but will answer the purpose all right and will often save the breaking of a good buggy. An open bridle is best, for when broken in an open bridle they will usually go all right in blinders. Always start a colt with an easy bit, for a severe bit that will irritate the mouth will often make them misbehave where they would otherwise go all right. When first hitching a colt always use a harness with a breeching, so they will get used to it along with the rest of the harness. Now before hitching it is best to put the hopples on, and then, should he do anything wrong, you have something to protect yourself, and if he goes all right you do not need to use them. Some people object to the use of hopples, but they are very useful, as they will teach a colt to stand in a much shorter time than can otherwise be done.

When hitching the first time, be sure and not frighten the colt, as success much depends on the first time hitched. As soon as the colt is gotten into the shafts and everything is securely fastened, get on the cart and start the colt off as quietly as possible. Should he attempt to run or do anything out of place, a gentle pull on the hopples will straighten him up all right. Keep him at a moderate speed, stopping occasionally, and, above all things, do not overdo a colt. About two hours will be sufficient for the first lesson. Many people think they should wear a colt out just on the start, but this is a mistake. Kind treatment and moderate driving will accomplish more in less time. The colt should receive these lessons every day until thoroughly accustomed to driving. Should a colt have a tendency to shy, never whip him for it, for if you do he will shy worse next time. In getting a colt accustomed to the cars do not go too close at first, but gradually drive a little closer each time until he will finally stand quite close without fear. Should a colt get his tail over the line do not pull on the line, for if you do he will soon learn to grip it, and cause trouble. Just slacken it, and you can usually get it out without any trouble.

In teaching a colt to back when hitched, do it in much the same way as when driving with the lines, being careful not to expect him to back too quick. In bringing a colt in after being driven never do up the lines first, then the tugs, and last the hold backs; but always do up the tugs first, then the holdbacks, and, last, the lines. So much for the colt in single harness.

Now a few words about hitching double. It is best to hitch with some well broken horse that is a good walker and never with some lazy old skin that has to be whipped to get to move out of his tracks. A colt that has any life or snap in him will in nine times out of ten be utterly ruined. Use much in the same way as when hitched single. If colts are heavy enough, it is well to do some light work as they will learn just as fast and, besides, will pay for the handling, and even light horses often make better horses if used at some light work. In teaching a colt to draw, load light at first and keep increasing the load as you see he is able to handle it; encourage him to go up on the line and start easy, and be sure and not put a load behind him that he can not handle, neither put him in a place where he has not good footing. After being nicely started, the object should be to keep them going nicely, using care not to undo anything that has been done.

In preparing horses for sale, however, breaking, while important, is only half the battle. The merchant seeks to arrange his goods in such a way as to be attractive to his customers; the successful horticulturist considers it very important to pack his fruit in neat, attractive packages; while the butter-maker is also taught to lay special emphasis on packing his products in like manner. No live stock breeder expects to win prizes in the show ring unless his stock is in show condition. And with even more truth we may say that no farmer can expect to receive an adequate return for the colts he has raised and broken unless he fits them in such condition as to meet the requirements of the market. The market demands horses of mature age, and it matters not whether they are trotting, coach, or draft horses; they must be in high flesh to bring what they really should. Farmers as a general rule fail to recognize this last fact and thousands of dollars are lost to the farmers of every county in this State from this cause alone. Every reader can recall instances, either on your own farms or your neighbors', where losses have occurred from this very cause. A horse is not recognized on the market as mature until five years old, and for a farmer to sell his draft horses before they are this age is sheer folly, for they can be broken when two or three years old, and can easily pay for their keep from then until they are mature.

In discussing the fitting of horses for sale we will suppose that we are taking our horses in the fall four and a half years old, and expect to sell them in the spring. The first thing to be done is to prepare comfortable stalls, which should be kept well bedded. Should there be a number of horses, arrange them in their stalls so as to best attract the eye of visitors or buyers who may happen to visit the farm. It is not necessary to keep them idle, they are just as well doing a moderate day's work; but under no consideration overwork or overdrive. It is a common practice to take horses out that have not been driven for some time and let them go as fast as they want to. A horse will do better to work or drive at a reasonable pace every day in the week than to get a half day's overwork or overdrive. If they are not needed for work, they should be driven about two hours for exercise every day, but under no consideration turn them out into the stalk field and let them stay all day in all kinds of wet, cold and stormy weather. There is no objection to them running in the stalk fields, but it should not be for more than two hours each day.

Always water before feeding, and never after until a period of two hours has elapsed. Always keep salt within their reach. Hay should be fed in small quantities. Many horses are ruined by feeding too much hay, as it makes them pot-bellied, and, if not of the best quality, is bad for their wind. About three-fourths of a pound per day for every 100 pounds of weight of horse is enough. For instance, a 1,600-pound horse should get twelve pounds per day. For light horses even less will do. The grain ration should consist of corn, oats and bran, mixed in the proportions of fifty pounds of corn and oats and twenty-five pounds of bran, and of this mixture they should be given about one pound to one and one eighth pounds for every one hundred pounds weight of horse, divided in three feeds. For instance, a 1,600-pound horse should get eighteen pounds per day. This is approximately correct. There are cases, however, when it would be necessary to feed a little more or a little less. About two quarts of bran with a handful of oil meal added, and made into a mush and fed about eight o'clock in the evening, will be very beneficial, as is also a feed of carrots once a day. Always see that they clean their feed up well and are ready for the next meal.

Grooming is very important. A horse with a sleek, glossy coat is much more attractive than one with long, dry hair. They should receive a good cleaning at least once a day of head, neck and body, and not neglecting the feet and legs. The mane should be kept well brushed over so as to give the neck a neat appearance. Do not use a curry comb on the mane, as it tends to cut the hair and thus gives the neck a rough appearance. The singer can usually be used to good advantage to do away with the long hairs around the belly and throat. In light horses a great improvement can be made by clipping the legs as far as the knee in front and as far as the hock behind. This requires to be neatly done, well tapered off at the knee and hock, so as to look as smooth as possible. The hair in the ears should also be clipped out and the mane pulled. The feet should also receive attention by keeping them trimmed and well leveled. A few hours put on a horse in this way will add much to his appearance, as well as several dollars to the selling price.

When the horse is nearly ready for sale, give him occasional lessons in the halter practice. Teach him to trot up well with a graceful carriage of his head, and when about to stand him for a buyer to look over always select a spot so as to have his front feet the highest . Just imagine what a horse would look like with his front feet in a hollow! It is quite often done, nevertheless. If they are to be shown in harness, have it well fitted. See that the blinders are not too low, giving an untidy appearance to the head, and that the crupper strap is not too long, so as to let the back-band too far up on the withers, thus making the back look too long. Also see that the breeching does not hang too low, giving a slouchy appearance to the hind quarters. In showing horses in harness have them taught to drive up, also to stand with their heads well up, and when about to stand them have a spot in your eye where their front feet will be on a raise.

THE HORSE'S HEAD.

Homestead.

When examining a horse and especially one intended for breeding purposes the head should be given particular attention. It may seem to many beginners that there is little of moment about the head. Let us see! It cannot be denied that in man the face speaks for itself in a majority of instances. It is so with horses to a certain degree. For instance one comes to the conclusion that a work horse is obstinate if the profile is bold and of Roman conformation. He says when he sees too much "white" in the eye, "Look out! He's unruly or a runaway." Then, too, we judge when the ears are drooping that the horse is either a "dummy" from brain trouble or a "loafer" from constitutional "weariness" and dislike for work. If, on the other hand, the ears are set and no attention is paid to sound we conclude that the animal is deaf or if the ears are constantly on the move we suspect that the eyes are at fault. Coming to the close examination of the head we like to see breadth between the eyes as an indication of brains and intelligence. Your narrow-browed, long-visaged horse is a weak, silly beast and usually lacks stamina for work and to withstand exposure. It is so surely if his nostrils are small and tightly shut. On the other hand, wide, clean, thin, flexible, dilated nostrils bespeak vigor, vim, "staying" powers and good lung development. With the lazy disposition we are apt to find a flabby, hanging lower lip, meatiness of face, dull, or shrunken eyes and eyelids and general coarseness of conformation. In the horse of quality, be he of light or heavy breed, the muzzle is fine, lips firmly shut, face lean and clean-cut and eyes bright, prominent and alert. In the latter horse, too, the ear, like the eye, is alert, fine in texture, pointed and erect. If the ears are held back during examination look out for meanness or vice; they should when erect form a practically straight line with the face, but in mares there is a slight tendency to dish face and in stallion, to the opposite conformation.

Let us get back to the eye. While it should be bright, that brightness may be due to "amaurosis" or paralysis of the optic nerve, causing incurable blindness. When a horse suffering from this disease is led from a dark place into the light the pupil of the eye does not become less. In a sound eye the pupil should dilate in the dark and contract in the light and have an elliptical shape. In amaurosis and cataract or blindness from periodic opthalmia the pupil retains a spherical contour. In such cases, too, the eyelids are seen to be wrinkled, and the orifice of the eye less than in health. The latter signs of unsoundness are of great importance, seeing that they are indications of a former attack or two of periodic opthalmia (moon blindness) which comes and goes until it finally causes total blindness of one or both eyes. Where the disease has run its course the eye appears to be milky in color and any trace of scum on the eyeball may be considered suspicious. Look, too, at the inner canthus or corner of the eye and see that there is no enlargement of the "haw" (membrana nictitans) or running of tears over the face, as this may indicate obliteration or stoppage of the lacrimal duct, the cause of no end of trouble during hot weather and fly time. Stand in front of the horse and note the contour of the head below the eyes. In this position it is easy to notice bulging of one or both sides, denoting trouble in teething in young colts, the presence of a diseased molar or chronic catarrh in older horses, or "big head" (osteo-porosis) in cases where the teeth are not at fault and where there is found a thickened condition of the bones of one of the lower jaws as compared with the other.

A scar under the eye, having a circular shape, should suggest that the trephine has been used for the punching out of a diseased molar tooth in upper jaw and cause the examiner to open the mouth and inspect the teeth. A pronounced "dent" in the bones of the face should lead one to examine for fractures, chronic catarrh or "nasal gleet" and is often seen in glanders, in which case an examination of the lining membrane of the partition between the nostrils (septum nasi) will disclose the presence of ulcers or a "mouse-bitten" appearance, as it is often called, together with a discharge of a sticky nature from one or both nostrils and grape-like tumors between the jawbones. There should be no discharge from the nostrils, and the lining membrane should be a healthy pink in color. If purple spots are seen the horse is either coming down with an attack of purpura haemorrhagica (anasarca) or has recently had a severe attack of colic or some inflammatory disease. When examining this part run the finger into the false nostril over each true nostril for the location of cysts or tumors which may interfere with breathing or cause other trouble and always see to it that one nostril has not been plugged with a sponge to hide broken wind. Examine top of head between, and back of ears for evidences of "poll evil" or scars telling of a previous attack; examine base of ear and its edge for discharging fistula of the bursa mucosae, or fistula proceeding from a supernumerary tooth. See that the throat-latch is clean cut, that the glands under the ear are not enlarged or scarred and that there is no tumor on each side of windpipe at throat or on windpipe lower down where a tracheotomy tube has been used during a bad attack of laryngitis, possibly leaving the horse a "roarer." Apart from soundness and returning to good conformation of the head see that the jaws are wide. Some horses have "scissor mouth" from abnormal narrowness of the upper jaw, but more often we find undue narrowness of the lower jaw, making proper mastication of food impossible and giving the horses stiff action of the head. Then, too, the teeth should come together properly in front. "Parrot mouth" is caused by projection of the upper jaw over the under jaw and the opposite condition is occasionally seen. In stallions the head should have a bold, masculine appearance, but in mares we wish to see docility, sweetness of temper and maternal love indicated by softer contour and placidity of expression.

THE LEGS OF DRAFT HORSES:

Dr. A. S. Alexander in Homestead.

Continuing our hints to the beginner in the breeding of draft horses some points relative to the quality of legs to be chosen and bred for will prove of interest and importance. While every engine must have a capable and adequate boiler for the generation of steam and every horse a fully developed body for the consumption of food and furnishing of force the "working parts" of both machine and animal are of first importance. The material entering into the formation of these parts must be of first class quality and every part must have its proper relation to its neighboring parts so that the whole may work harmoniously and well. So in examining a horse it will be well for us to pay special attention to the feet and legs.

To a novice in the business all legs look alike, to a certain degree, but when we come to make a close investigation and compare parts and relationships we find that there is a great diversity of type and quality in different horses and different breeds. In every horse, however, there are necessary qualities of foot and limb irrespective of breed. It is said, for instance, that "no foot no horse," but every horse has feet and most of them have fairly good ones provided they are set on good legs. It is the leg, then, that we shall first consider.

It is a common saying that a horse should have "flat bone." This is but partially correct, for there is no such thing as flat bone in the legs of a horse. The leg bones are like the blade of a razor in shape with the back of the blade turned to the front and the thin edge to the back. Such a bone presents a flat surface looked at from the side, but cut through a section will have an eliptical shape. When the leg appears to be round that fact is caused by lack of development of back tendons and the presence of a surplus covering of coarse tissue. What we are after is a "flat leg." This is denoted by a clean, practically tissueless bone from the back of which the tendons stand out distinctly and so that they can be readily grasped in the hand. From such a tendon and bone in the best draft horses of the Clydesdale breed and the improved English Shire the hair should grow as a silky fringe. Such hair or "feather," as it is often called, should not hide the bone and tendons nor surround the leg. Neither should it be coarse and kinky, like the dead horse hair stuffing of a sofa, or be so profuse in growth as to be plainly a nuisance. Hair of the right quality is a sure evidence of a flat, compact "gun-metal" bone and as a rule goes along with clean, well-marked tendons. Such bone is seen in the best class of the breeds mentioned, but is by no means a special possession of these breeds. It should be seen in every draft horse whether accompanied by "feather" or not.

When coarse, gummy, kinky hair is seen about the legs of a draft horse and its presence can not be successfully explained by the lack of care of the owner, look out! The entire animal is apt to correspond in coarseness to that of the hair. He is likely to be sluggish, dull, gross, unimpressive as a breeder and apt to beget progeny prone to grease and other kindred evils and ailments. Given to a clean bone and well developed tendon see to it that there is enough of such bone in comparison with the weight of the superimposed body. See that the joints are large, clean and properly set. The knees should be wide and ample and the hocks clear of all excrescences, puffs, fillings and adipose tissue.

When we find a clean leg and good joints the spring of the pasterns should be the next consideration, for no matter how nice may be the quality of the bone and tendons these good qualities are largely destroyed by a steep pastern which makes the action stilty, stiff and sure to cause trouble from severe concussion. We require oblique pasterns to offset concussion—to gradually or easily convey the concussion from the foot to the pillar of leg bones above it. Looking at the profile of the leg the angle of the front of the hoof should be exactly that of the pastern. Any serious departure from an angle of 45 degrees is to be considered a grave error not to be set right by paring or shoeing and to be rejected if possible in breeding. A springy pastern possessed by a horse having clean bone and well-marked tendons with or without the fine hair alluded to above may be taken as indicative of free, straight action.

Action and quality go together and it remains in examining a horse to see that this is the case when he is moved at a walk and trot. If his legs are properly set and his joints under proper control he will go and come without "paddling," or "wobbling." The feet will be carried in a straight line and rise and fall rhythmically, showing the shoe soles both fore and aft. A plummet line dropped from the center of the elbow joint should cross the center of the knee and pastern joint and back of the foot and the same line hung from the hip joint should cross the center of the foot and divide the gaskin in the middle. By this rule it will be easy to notice whether a leg good or bad is in or out of the proper position and whether the hind leg is crooked or sickle-hocked, hence prone to curbs and other ailments.

Learn to look first at the feet and legs of every horse and soon it will be natural to make instant comparisons and to distinguish in departures from the normal or ideal type kept ever in mind by the trained judge of horses. We arrive at all information as to soundness and correct judgment by a negative process. In other words, we look for possibilities regarding unsoundness or departure from good type and not finding them conclude that the more or less perfect condition or conformation is there. In addition to this manner of approximating good points we acquire a faculty of "sensing" quality and valuing parts. Such proficiency requires time, a correct eye, constant study and experience, but it is based at the outset on understanding of quality and bone, hair and tendon together with a mathematical knowledge of angles as they apply to pasterns and hocks, to say nothing of the knees and set of the shoulders.

In breeding ever endeavor to improve types possessed, for many otherwise noble specimens of the draft breeds are woefully deficient in slope of pastern while others have good pasterns and poor feet. Good feet should be dense in structure, well developed, but not oversized, wide in heel, concave in sole, free from cracks, mealiness and rings and having large, well developed frogs in contact with the ground.

TREATMENT OF SUNSTROKE OF HORSES.

Dr. A. S. Alexander, Wisconsin.

During periods of excessive heat, when work horses in the fields or upon the streets are liable to suffer from sunstroke or overheating, much may be done by the owner to lessen the likelihood of an attack. Seeing that affected horses are usually those that are sick or soft, every possible means should be taken to prevent indigestion and fit the animal to withstand labor in hot weather. Horses under five years of age are more apt to suffer than seasoned, adult animals; hence should be worked lightly during hot weather, as should new purchases and horses being acclimated in a new location. Indigestion, the common forerunner of sunstroke, is indicated by dullness, sluggishness, thick urine, panting at light labor, sweating in stable and the changeable character of the manure, which is normal some days, and again clay-colored, mucous covered, or an undigested, offensive mass. When so affected it is extremely dangerous to work the animal in extra hot weather.

The symptoms of overheating are: the horse lags, requires urging, may pass soft manure and gas, sweats, but dries off suddenly, becomes weak, staggers, pants, has dilated nostrils, red eyelids and linings of nostrils, anxious countenance, weak, rapid pulse, high fever, and falls. In sudden attacks may fall at once, show above symptoms and die in a few minutes or hours after period of madness or unconsciousness and loud snoring. Following bad attacks the brain becomes softened and the animal stands with head jammed in corner, is blind, forgets to chew food and remains stupid, weak and useless in hot weather. Less severe attacks recovered from unfit horse for work in warm weather.

Do not bleed or allow bleeding to be done. Do not give aconite, belladonna, acetanilid. They are highly dangerous in amateur hands. Do not put ice pack on the head, as it tends to produce softening of the brain. Stop work immediately, remove harness, get horse into a shady place under a tree where there is a breeze or draft of air. Administer half a pint of whiskey in equal quantity of water, or two ounces alcohol well diluted with water, or two ounces sweet spirits of nitre and one ounce aromatic spirits of ammonia in one quart water.

Repeat in half above doses hourly until horse revives. Add four ounces of granulated hyposulphite of soda if he is bloated. Tap with trocar and canula high in right flank if bloating is excessive, and in bloated cases give rectal injections of soapy warm water hourly. High fever may be detected by hand in horse's mouth or use of thermometer in rectum. If it is 108 degrees or over, give one ounce saltpeter dissolved in pint water, in addition to stimulants prescribed above and repeat in six hours. From start of treatment keep cool, wet packs to poll of head and sprinkle entire body with cold water from a sprinkling can held a foot above body.

On recovery feed lightly upon bran mashes and a little grain, and allow rest for two weeks. Do not work again in hot weather during season of attack. Where symptoms of brain softening remains after attack, give one drachm iodide of potash three or four times daily in a little water according to severity of symptoms and continue cold wet packs to head. Feed soft light easily digested food.

D. SHEEP.

THRIFT THE GREAT ESSENTIAL IN SHEEP FEEDING.

Jacob Zeigler, Clinton, Ill., in Bulletin Missouri State Board of Agriculture.

In sheep husbandry there is one thing that must be observed and not overlooked and that is thrift. Thrift means health, gain in quality, quantity and productiveness, hence profit, and profit is what we are after. It should always be the object of the flock master to keep his sheep in a thriving condition. The quality of the wool as well as its quantity and the general productiveness of the flock demand this system.. Now the question is, what are the esentials of thrift? I say good feed, water, shelter and close attention of the shepherd. It is the worst possible practice to allow the sheep to fall away in flesh as the grass fails in the autumn. The increasing wool conceals the shrinking carcass much to the disappointment of the careless flock master. Better confine them in the yard than to allow them to ramble about in some field in search of food, which furnishes a little green feed but too light to be of any real value.

For winter fodder there is nothing better than fine early cut clover; cut when in bloom and well cured. Hay from old meadows consisting of a variety of grasses is very good. Sowed or thickly drilled corn for fodder, cut and well shocked in good season, is also splendid feed. Good corn stover is a good and cheap feed. A feed of bright oats straw two or three times a week can be fed to a good advantage, and the leaving of the straw and stalks makes a splendid yard and a good absorbent of the manure. Bright sheaf oats fed once or twice a week in racks is also an excellent feed. It answers for both grain and fodder.

Fresh water is very important to have in the yard. It is a mistaken idea that sheep do not need water. In August and September of 1894 I had 150 ewes with that many lambs in a pasture, and they drank a trough of water every day that held 210 gallons, nearly one and one half gallons average per ewe. They can, however, go longer and do better without water than other stock, but thrive much better with it.

Shelter is very necessary. It is the first necessity in providing for wintering sheep successfully in northern latitude. Fine wool sheep will bear exposure better than any other kind of sheep. For the open fleece of the large mutton breeds parts on the back when wet and admits the water, which completely drenches the animal, so that its abundant fleece is no longer a protection from the cold. Economy in feeding also demands shelter, as not only less feed is required but is better preserved from waste. For they will not eat or drink that which is in any way soiled or out of a dirty trough unless forced to.

For lambs, however, I prefer a closed house with large double doors on the east or south of the building and left open except in storms or rainy weather, then shut them in, as they do not crowd themselves in shelter like old sheep, and they do better in a closed shed, however crowded, than in a roomy, stormy outdoors.

Lambs should have grain from the time they are ten weeks old till the following spring. A trough can be set with oats in it outside of the pasture fence, near the watering place with opening in the fence for the lambs to get it. They will then learn to eat by the time they are four months old, at which time they should be weaned. In weaning give them the best green pasture you have and what oats they want to eat and plenty of good water and salt. They should be kept in that way until they are put in winter quarters, then they should have from a half pint to a pint of equal parts of shelled corn and oats per day, owing to the size and breed of the sheep, with all they can eat of good hay.

Stockers will do well fed on good hay alone, but better on a variety with a little grain in stormy weather. A daily ration of one pound of grain with straw stover or any kind of roughness is a very good feed for stockers. Sheep can be fattened on various feeds, such as corn, peas, beets, barley, oats, clover and grass, they do well on either. But for winter feeding my best results have been from corn and clover hay, that fattens fast and makes the best of mutton, and when all things are considered is as cheap as any, except green clover, which produces a very cheap mutton, but the losses from clover bloat and low price of sheep at that time of year reduce profits in proportion.

I feed two bushels of corn twice a day at regular hours to 100 sheep (I am speaking of the mutton kind, averaging about one hundred pounds) and as much clover hay as they will eat up clean, which will be on an average of about two hundred pounds per day. They will, however, need and eat more at the start, but will decrease in eating hay as the grain ration is increased. Care must be taken in starting them on grain so as not to overfeed them. Feed a bushel twice a day to start on, then lightly increase daily till you get them on full feed. Larger sheep need more and smaller less in proportion to weight. The corn is cut an inch long with a corn cutter and fed in troughs ten inches wide, seven inches deep in the clear; twelve to fourteen feet long is a nice length, but length may be made to suit fancy. The corn may be fed shelled, but I do not like it that way because they eat it too fast, and some get more than they need, but in cut corn, the eating process is slower, the food is better masticated and there is a better chance for all to get their share.

They should always have free access to fresh water and salt and never be left without it. They drink lots when on dry feed; they don't drink so much at a time, but often. Good thrifty sheep thus fed will fatten and gain thirty to thirty-five pounds each in seventy-five days, and ought then to go to market, for it rarely ever pays to feed them longer. The gain, however, will depend largely upon their condition when put up for feeding. If fairly fat they don't gain as much as if in moderate flesh and thrifty, nor do they require as much feed or as long feeding.

If one has no clover for hay then sow one and one half bushels of oats with one bushel of field peas per acre and cut when in dough and cure like hay. It yields big and is a fine substitute for clover hay. Corn fodder does very well but is not as good as either of the former.

Never allow feeding sheep grass in winter, as the grass is too light and soft to be of any real value to them, and the losses in searching and rambling after it and the refusal of other feed more than double the supposed gain.

The feed lot should be in a dry place. Have a shed, closed at one side and the ends and roofed over to keep out rain and wind. Both it and the yard should be bedded with corn stalks or litter to prevent mud and wasting of the manure. A timber lot or small grove well set with trees is a good place to feed in. The trees are protection enough without shed, but in a wet winter a shed is far better and the manure can be saved better.

Salt and hay should always be fed under cover—hay in racks and salt in troughs. Economy in feeding demands this system, for water-soaked hay is always rejected by sheep and salt wastes much from rain.

Of course it is understood there are other good feeds to fatten sheep on, such as mill-screenings, oil meal, etc., and are used by regular feeders who buy both sheep and feed to fatten them in large numbers for speculation, which does not interest us. But what we are interested in is how we farmers and stockmen who raise a part of all of the first mentioned product on our farms can turn it into meats so we can drive it to market instead of hauling it and realize as much or more for it than it would bring in a raw state, and enrich our soil besides, so we can raise more and better grain and stock.

To do this I believe our own raising the most profitable feed. It saves the expense of transportation to and fro. And when thus fed and the manure has been hauled and well distributed over the land it will always retain its fertility and will get better every year instead of worse. From my own experience it pays best to feed it to sheep. They return more pounds of gain for the amount of food consumed than cattle or hogs. Besides, mutton brings more per pound than beef or pork and furnishes better manure than either.

My sheep have gained me from start of feeding to finish eight to ten pounds of mutton per bushel of corn, while the gain of my cattle of equal quality and feed runs from seven to eight pounds. My hogs eat corn, corn from first to last, and only a little grass for change, while my sheep eat grass, grass from first to last, and only a little corn to start lambs and to finish them. This is the cheap feed vs. high-priced feed.

I find from my shipping bills, which I have saved for twenty-five years, from 1873 to 1898, that the average price received for my stock in Chicago during that period was $4.93 per 100 pounds for sheep,

$4.86 for steers and $4.85 for hogs, and the average weight was, sheep 126½ pounds, steers 1,354 pounds, and hogs 218½ pounds. From this you can see they had to be all of good stock to average that weight.

The foregoing facts, obtained from my experience, convince me that sheep are, in general, the most profitable stock on the farm, especially on thin and high land. In conclusion I will say, keep none but the best of whatever breed you have. They will pay when poor ones lose. Sheep are easy to handle and easy to retain in an inclosure that would not hold other stock, and they are the best weed destroyers on the farm. Taking all things into consideration, the sheep certainly has much to commend it to the farmer.

HOW TO START IN SHEEP.

Wallaces' Farmer.

When farmers in the corn and grass states reach the point where they have their fields all fenced hog-tight and sheep-tight, they should not delay for any considerable length of time getting a start in sheep. It is not necessary to have a large flock. It is a good deal better not to have it for two or three reasons: One is that sheep do not do well with hogs and cattle. This is the reason why so few sheep are kept in the hog and cattle country. Another reason is that those who have had no exeperience in sheep would do well to advance slowly, and, if need be, retreat rapidly. Twenty-five ewes and a good buck are as many as the inexperienced farmer should start with. The expense of these is comparatively small, the possible loss therefore not great in case the man should prove not to be a fit man to handle sheep. There are some men of this kind. The chances of loss, however,, are very small where the farmer has any kind of sheep gumption about him.

There are a whole lot of little things to be learned in growing sheep. The sheep has less sense than anything else grown on the farm unless it might possibly be a very stupid old hen. They have been so long kept under subjection that they have no mind of their own and the farmer must do their thinking for them. There is a whole lot of experience to be learned in handling the lambs on account of this sheep stupidity. In fact, there are a lot of details in this as well as in every business which can not be learned on paper.

Why, then, do we urge farmers to keep a small flock of sheep? First, on a quarter section farm twenty-five ewes and their lambs can be kept with practically no loss in the capacity of the farm to grow other crops and live stock. To that extent they can be used as scavengers. They are especially valuable in keeping down weeds, and even if they did not pay a cent of profit they would more than pay for themselves in this line of work. There is scarcely a weed on the farm that the sheep will not eat. The only two our sheep have ever balked at are mullen and thistle. We will never get the weed pest under control properly until we try our hand at sheep.

The farmer who is the sole grower of sheep in the neighborhood must not expect to have the same measure of profit as the farmer whose neighbors all join with him in keeping a few sheep. The latter's particular advantage will be in the sale of lambs. To make sheep growing profitable it should be possible to buy them just as you would buy hogs; in other words, be able to buy up a car load at any time during the lamb selling season, say from June to January. If farmers generally realized the real profit there is to them in keeping a few sheep, this condition of things would soon exist. There is no difficulty when a man can sell lambs to an advantage in making the lambs and the wool pay the entire original cost of the flock, thus giving him a start at the expense of the year's keep; that is, a man can put $150 into a flock of sheep in October, 1903, and can sell $150 worth of lambs and wool in October, 1904, and in the years following have as much money each year for the keep of the sheep.

As 800 pounds of sheep can be kept on the same land as 1,000 pounds of cattle, our readers can readily see that there is plenty of money in these small flocks of the animal with the golden fleece.

GRAIN FOR SHEEP.

Homestead.

Some very erroneous ideas have crept into the sheep business that are difficult to eradicate. When once an old sheep man gets the idea that exposure will bring scab it sticks to him like enthanasia to a lifeless Ethiopian. It can not be shaken off no matter how much evidence one produces that this disease is one that can be contracted only by infection and not by exposure. There is a prevailing idea among some sheep men that sheep do not need shelter, or that they really require water. Some have gone so far as to believe that they need no grain in winter. In some countries but very little grain is needed. In latitudes where grasses keep green all winter it may be well to not feed much grain. In the great grain belt of the United States, however, it will be fashionable a long time to feed some grain.

We have long since been favorable to feeding sheep grain. We have become convinced of this fact after giving the practice a fair trial. It will be well to know for what sheep are fed before engaging industrially in the business. If they are being fattened for the market they should be pushed to a finish as fast as possible. If breeding ewes they should be fed with a view to a healthy growth of the fetus and a keeping up of the vitality of the dam. The conditions will have to be surveyed and feeding carried on accordingly. Corn has become the universal grain feed in some localities and its use can be abused in feeding sheep. It is an excellent fattening grain ration, but will sometimes cause trouble when the feeder is trying to avoid it. In cold weather it can always safely become a part of the ration.

Oats will be found safe at almost all times. Recently a new grain feed has sprung up in the vicinity of some of the large mills. It is that of screenings. Of this kind of fed Mr. Henry Stewart, an authority on sheep, says: "Those so-called foods which have been in considerable use, such as screenings, damaged grain, and—so to say—the offal of the grain dealers or the threshers of the flouring mills, are of late so nearly cleaned of whatever of actual grain has heretofore existed in them as to be useless for feeding, on account of the almost exclusive existence in them of noxious seeds of weeds, quite often it seems to be the part of wisdom, as it is also of economy—and this is equivalent to the former—to avoid the use of them, as wholly devoid of economy; for one reason because there is little feeding matter in them, and for another one, which is of serious importance, that most of the seeds of which the screenings consist are of noxious plants, and so hurtful, as well as without any feeding value. The most frequent seeds found in them are those of cockle, and these contain a hurtful substance known as saponine; thus in choosing and purchasing screenings samples containing this kind of seeds should be rejected, all the more so that it is not at all necessary that the screenings should contain any of these seeds, for, the reason that special apparatus, is or may, and should be, attached to the machinery to separate the cockle seeds from the small grain. The small grain is itself an excellent food for sheep, and is so constituted as to be a perfect food, healthful and nutritious, and in fact really better for sheep than the finest grain itself would be, and this for the reason of its large content of bran as compared with the flour of the grain. The fact is that screenings should be graded and sold on its actual merit, and unless this is done by sellers of the stuff and a guarantee given with the sample, feeders should be suspicious of the character of it. Competition in all industries has become so close that no one can afford to neglect any possible economy, and there is no other part of the care of live stock that calls for closer circumspection now than the feeding of sheep."

WINTER QUARTERS FOR SHEEP.

Homestead.

There are as many different methods for wintering sheep as there are breeds. The man who said he had no difficulty in wintering sheep, but that it "was springing them," that always gave him the most concern was not very far from the truth. The winter management should be such that they will be as vigorous and healthy during the trying months of spring as in mid-summer. In mid-summer the feed is ideal, consisting of grass, weeds and other green herbage. The weather is balmy and not taxing on the vitality of sheep. Exercise is just in accordance with the demands of good health in the sheep. In winter all these conditions are changed.

Instead of grass we have hay and dry grain for the sheep. Instead of warm weather we have a changeable temperature from freezing to below zero weather accompanied by sleet, rain, snow and high winds at times. The coat of the sheep is protection against cold, but not against dampness. It is rather inviting to it than repellant.

Shelter consists of promises between a wire fence and a good bank barn. These will run all the way along the line including board fences, hedge fences, timber belts, groves, open sheds, sheds that are paritially enclosed and good barns of various types. There are those who claim greater health for their sheep when they are exposed to all kinds of weather. We never took kindly to that plan, and yet it is not without its benefits.

A sheep exposed to all kinds of weather will take more exercise, which is a very good thing up to a certain degree. Enforced exercise beyond what is healthful will be damaging. It requires plenty of fed to keep up the combustion that must take place in the bodies of sheep to keep them warm. Protection from storms means a saving in feed.

We have found it necessary to keep sheep dry in winter and they will keep warm. Except for winter lambs it is not necessary to keep barns and stables warm for sheep. We prefer to have a barn two sides of which are composed largely of doors. We prefer rolling doors. When bad storms come these doors can be closed and in fine weather they can be left open. As a rule a storm that a sheep will not take refuge from, if well fed, will not be detrimental to its welface. On bright, cold, winter nights we have seen the entire flock lying contentedly outside of a good barn, preferring the open air to the close air of the barn. Perhaps the next night every sheep will be found inside.

It is well to have good shelter on hand that can be regulated according to the demands of the weather. It is far better to have it and not have use for it than to let sheep suffer and by such suffering lose their owner money. Next to shelter should be provided plenty of good feed. By good feed we mean anything at hand that will keep the flock in good condition and in good health.

THE ART OF FEEDING.

Homestead.

We have been asked by a beginner in the sheep businss to give in detail the art of feeding sheep and lambs.

This is an art that is only acquired by experience. We have been giving results of experience for many years and have been pointing out some of the best plans.

Amateur feeding operations are frequently attended with unsatisfactory results, but persistency will bring its reward.

The man who feeds cattle one year, sheep the next and some other hobby the third year can hope for nothing else than failure.

To succeed in this business one wants to stay with it year after year. Every move will be an educator. He will know more each year about buying, selection, the manner of feeding, time of marketing and a score of things that cannot be put in print.

The lamb feeder needs to see his lambs before eating, during the time of eating and after they have eaten to know how they are doing.

When several lambs lag back, indifferent about coming up to the trough, it is evidence they are getting too much grain. The next time there may be more. The ration should be cut down until all come to feed.

It is not a good plan to give too much salt, as dropsical conditions are induced by it. Salt regularly and sparingly while on feed.

The better the feed the less time will be required to fatten.

Some error has been allowed to creep into feeding operations by stuffing all the time. It is not the amount of feed given as much as it is the amount assimilated. Assimilation can go on so long as the sheep have good health. Gluttony tends to disease when no good can come from it.

We have observed that the best feeders do not keep sheep on all they will eat, but they do keep them thriving and laying on fat.

DISEASES OF SHEEP.

Homestead.

Many years ago the only disease sheep were known to have was foot rot. Later scab developed and it was thought to have been the result of neglect.

All old diseases have been met half way and good remedies found for them.

Some of the later disorders of sheep have not yielded so readily to treatment.

The diseases which have been found most troublesome and stubborn are those occasioned by parasites. Of these there are several different species.

Scab is caused by a parasite, but it is external rather than the most dangerous, which are internal. The latter are: Stomach worms, lung worms, intestinal worms, tape worms and nodular worms.

For tape worm oil of male fern seems to be the favorite remedy, a teaspoonful being a dose. Two teaspoonfuls of powdered areca nut is also a good remedy. One teaspoonful of turpentine given in milk is said to be effectual. Most of these should be given after fasting and followed with a laxative.

The latest remedy for stomach worms and nodular worms is what is known as the iron remedy. Give in grain sulphate of iron (copperas), sometimes called green vitriol and must not be confounded with blue vitriol, a dose being ten ounces of the drug to thirty-five lambs. Give daily two weeks, then stop one week and give again. Mix in water and apply the water to the grain.

Gasoline is also considered a good remedy for stomach worms. Some danger accompanies this remedy, as lambs often die after having been given doses of gasoline. A dose consists of one tablespoonful in four ounces of milk.

A solution of 1 per cent coal tar is also good worm remedy given in doses of two to four ounces.

LAMB GROWING.

J. McCaig in American Sheep Breeder.

The attainment of early maturing properties in the modern mutton sheep is just as pronounced as it is in cattle. It is sometimes said that sheep are very impressionable, by which it is implied that whatever qualities are desirable in the animal are easily induced or secured in the sheep. This, however, is to be regarded as a result rather than an original property. The capacity for variation is to be measured by the degree of variation or molding to which an animal or plant has already been subjected, for every variation is not important alone for what is immediately attained, but is important besides as furnishing the basis for easy variation in the future in a new direction. The sheep being so constituted as a result of earlier improvements is to be counted as an advantage and a gain to the progressive and susceptible breeder, but has likewise its disadvantages. Just as edged tools are dangerous in awkward hands, so a highly improved animal is liable to deterioration in the hands of an unskilled breeder. The basis of such mistake lies in placing too great faith in blood as against care and management. Everyone recognizes that to have good offspring we must have good parents; some forget, however, that the perfection of the parent is not due to their blood alone or to selection, but to intensive feeding and careful management. Lapses and deteriorations are sometimes very sudden and very disappointing.

Let it be granted that a ewe at lambing time is a fine type and in good condition for the burdens of maternity; that she is moderately young and is strong and vigorous from sufficient exercise and is hearty and in good flesh from generous keep on suitable foods, there is still before the shepherd a task requiring judgment, skill and care in the rearing of a creditable product from such ewe. The lamb may be endowed with an inherent capacity for fast growing, but it must have attention right from the beginning. The necessity for this is forcibly taught by observing how neglect operates on the final character and profit of the lamb. If a lamb or young animal is neglected at the begnning it can never regain what is lost or gain in weight at as low cost as it can if it had been kept growing from the beginning. The reason is that the character and power of the nutritive mechinery depends to a very large extent on the way it has been exercised from the beginning. For the first three weeks, of course, the lamb is dependent wholly on the milk of the ewe and care of the lamb must be through the ewe. For two or three days the ewe should not be fed too highly. If she has been fed grain in slight excess over ordinary ration for three weeks before lambing to stimulate milk secretion, she may get milk fever if fed too highly just at lambing time, as the lamb may not take all she has to give. Lambs suck very frequently, however, about twenty times a day and readily adjust themselves to the appropriation of a liberal supply of milk, and their spindley frames fill and grow rapidly at all points. The main thing is to avoid disordering changes of food, which may affect the milk and induce either diarrhoea or constipation in the lamb. It is a common thing to see newly lambed ewes with left over or untasted food before them. It should be remembered that the first condition to healthy nutrition is appetite and if the ewe refuses food it is a good sign that she does not need it. Excess of soft food, such as roots, induces a flaccid condition in the ewe and thinness of milk, though some increase of succulent food increases the flow of milk after lambing. The food should increase in quantity, but not deteriorate in quality after lambing.

The important feature of lamb raising is the securing of an early adjustment of the organism to concentrated foods, for it is on food of this kind that rapid growth is secured. The practical value of early accustoming lambs to concentrated foods is that though the lamb, for example, after going on grass, may not be fed on concentrated foods steadily its organism can be counted upon to use such foods at any later time, for example, after weaning, with profit and without injury. This is a matter of more than common prudence and wisdom; it is a necessity. Unlike cows, sheep are exclusively meat animals. They have been nurtured and cultured with a view to the highest carcass development, and it is but fair to assume that selection to this end means, in this as in any other case, a sinking or subordination of some other functions. In other words, sheep not being selected generally for their milking qualities, the moderate character of milk supply must be met by hand supplementary feeding of the lambs on other foods.

Though grass and ewe's milk seem to constitute the cheapest possible ration for lambs for a given amount of gain, and a perfect ration from the standpoint of health and thrift, the modern view is not that it is an advantage to have lambs come when the grass comes, even for butcher's purposes. Lambs that drop in the pens in March have a hardy constitution and they get the right kind of a start to make fast growers by the side-feeding of grains and other foods. Lambs on the other hand that come on the grass, particularly some time after spring has set in, are not as vigorous as earlier lambs and do not attain rugged strength before the poor feeding and exposure of autumn weather come on. Besides this they are apt to suffer from milk disorders in the ewe. Ewes lambing late on heavy grasses are apt to get caked udder.

One of the principal advantages of intensive feeding in the spring and of the consequent rapid growth of the lamb is that it permits of early weaning. Three or four months is a better age than six for the weaning of lambs and the advantage of early grain feeding of lambs is that it can be resumed on the weaning of the lamb without the possibility of loss of weight or the retarding of growth from the change. The advantage is equally great on the side of the ewe, as it gives ample time for her to recuperate before the next breeding season.

In the selling of sheep, as in the disposal of any other commodity, it is the special rather than the commonplace product to which the artificial margins or profits fall. Whether a man is raising sheep to sell for breeding purposes, in which case large size is especially to be desired, or whether for butcher's use, he should try to have his stuff ready early. In the neighborhood of the cities lamb is now supplied in a steady stream all through the season from January on and it is during the early months of the year that prices rule highest. After midsummer there is a time when everybody has lambs to sell and when prices reach a dead level. On high priced lands near the towns and cities it is necessary that the products of all kinds be of a special character. Intensive production is the only condition under which such lands will pay. An indifferent product limited also to volume will mean loss on such lands. It is imperatively necessary that the man on a small holding should make his meat products quickly.

E. CORN.

CORN EXPERIMENTS.

H. M. Cottrell in Wallace's Farmer.

Mr. T. S. Hunt, a student of the Iowa Agricultural College, is helping us in our corn work, and has just noted an effect of harrowing that may be of value to some of your readers who have wet fields.

We are making a test of planting corn at different dates and are taking the temperature of the soil at the time of each planting. The experiment is being made on fall plowed land. The day each planting is made the land for that planting is thoroughly disked and then harrowed.

Our first planting was made April 22d and the second planting April 27th. Mr. Hunt found at the time of the second planting that the land on which the first planting was made had a temperature of 55 degrees three inches below the surface, while the freshly harrowed land on which the second planting was made had a temperature of 50 degrees at the same depth. This shows that disking and harrowing had the effect of warming up the soil 5 degrees in five days.

Some years ago the writer had a large area of land in another state to be planted to corn. It rained almost continuously until May 15th, and the soil was stiff and cold. It was so late in the season when the rains stopped that something had to be done immediately to prepare the ground for planting. We started disk harrows as soon as the surface became dry, although the horses' feet sank three to five inches in the mud. If this disked land had been allowed to become dry it would have been very lumpy. Just as the disked soil began to get dry enough to crumble it was cross-disked, and this left it dry and mellow enough for immediate planting.

A small field was left as a test until it became sufficiently dry to work in the ordinary way. This made planting so late that the crop was a failure, while a heavy crop was secured on the land disked while wet.

Professor King, in his book, "The Soil," says that it requires nine and two thirds times as much heat to evaporate water from the soil as it does to warm an equal quantity of water in the soil 100 degrees. Does not this explain why Mr. Hunt and the writer found disking so effective in warming the soil? The disking made a good surface mulch that prevented evaporation of water from the soil and the consequent cooling f it, and turned the full effect of the sun's heat into warming the land.

This spring the soil is unusually wet and cold on many farms, and our experience shows that on such land a thorough disking will hasten the warming of the soil sufficiently to allow of at least a week's earlier planting than on untouched soil.

Sac county, Iowa.

THE BY-PRODUCTS OF CORN.

Wallace's Farmer.

For the sake of our thousands of new subscribers it may be worth while to mention a great number of by-products of corn which have been constantly increasing, and will increase from year to year, thus giving new value to the corn crop, from which, directly or indirectly, western farmers receive most of their profit.

When corn is taken to the glucose factory, for example, it is first soaked in water for from thirty to forty hours. It is then passed through mills freely supplied with water, which remove the hull, free the germ, and break up the starch. Scarcely any of our readers need to be told that the four principal ingredients of corn are the hull, or bran; the germ; the dark looking substance in the center and on the top, mostly starch; and the hard substance on either side, which contains much gluten, but more or less starch. This pasty mass is run through a large trough of running water, which floats off the germ, the large amount of oil in it making it lighter than the rest. The remainder passes through Buhr mills of the same type as used in making flour. This pulverizes the gluten, bran and starch as fine as possible. It is then passed over frames of very fine silk bolting cloth, which sifts out the bran and lets the gluten and starch fall through. The starch being the heavier falls to the bottom. From this starch is made glucose, grape sugar, dextrine, and several varieties of gum. Glucose is simply grape sugar, quite similar in its composition to honey.

The corn germs are thoroughly dried and ground to a fine powder, which is put under a hydraulic press, which removes the oil. The rest is corn oil cake, which, when ground up, makes corn oil meal. Corn oil when vulcanized becomes corn rubber, which is mixed with Para rubber for the manufacture of boots and shoes. The bran is used for stock food, the gluten being used as gluten meal or mixed with bran and called gluten feed.

These represent a few only of the by-products as they go on the market, for there are a number of varieties of starch, a number of glucoses, three kinds of gum, four kinds of sugar, six kinds of syrup, including maple syrup fresh from the trees away back in Vermont, and others too numerous to mention—about one hundred in all.

CORN CULTURE.

A. D. Shamel in Breeders' Gazette.

As a result of the many letters on corn cultivation which have appeared in your journal, I have received many inquiries as to the results of our experiments on this question. As most of our recent experiments along this line have not appeared in bulletin form, I will briefly outline some of our results.

A test of a few of the different methods of cultivation in use at present resulted as follows:

Weeds allowed to grow	58 bushels per acre.
Weeds cut out with hoe and a loose mulch made with hoe, "frequent cultivation"	96 bushels per acre.
Two inches deep cultivation, small shovels	90 bushels per acre.
Four inches deep cultivation, small shovels	91 bushels per acre.
Six inches deep cultivation, small shovels	84 bushels per acre.
Six inches deep cultivation, large shovels	87 bushels per acre.
Gopher or blade cultivation	88 bushels per acre.
Deep early, shallow late, small shovels	85 bushels per acre.
Shallow early, deep late, small shovels	89 bushels per acre.
Mulched with grass	8 bushels per acre.

The conclusions from this experiment were that all the weeds must be destroyed at any cost. A loose mulch, made by stirring the surface of the soil, was very important in a dry season. Injury to the roots by deep cultivation reduced the yield per acre. To demonstrate the effect of root injury an experiment was carried on for three years with the pruning or cutting off the roots of the corn plants. The roots were cut off at different depths in different rows, about six inches from the hill (on all sides of the hill) three times during the season. The entire field was cultivated with a weeder in order that the cultivation would not interfere with the experiment. One row was pruned and one row not pruned throughout the field alternately, so that a close and accurate comparison might be made of the effects of root injury. The results of an average of the three years' work are as follows:

Not pruned	62 bushels per acre.
Pruned two inches deep	60 bushels per acre.
Pruned four inches deep	45 bushels per acre.
Pruned six inches deep	30 bushels per acre.

At the past winter's farmers' institutes the question was frequently asked, "Would deep early cultivation injure the plant?" In answer to this inquiry the acompanying photographs are shown. The young plant was taken up twenty-one days after planting and the root system washed out. At this time the roots spread from one side of the row to the other near the surface of the soil. The root development of the mature plant similarly washed out shows that there is a perfect network of roots in the surface soil. In fact, these surface roots largely supply the plants with the plant food from the soil. The deep roots anchor the plants and hold them in an upright position. Deep cultivation would doubtless cut off and destroy many of these important roots. I have seen men pull out bunches of corn roots from the cultivator shank at the end of the row. The amount of damage from such injury will vary with the season. In a dry season the injury must be very great. In a wet season the injury will be less because the remaining roots will be able to supply the necessary moisture for plant growth.

Some of the letters indicate that the writers have secured better results with deep cultivation than shallow cultivation. If this is the case, then it is the best system for them to follow under their conditions. However, in Illinois the majority of farmers will get better results from shallow and frequent cultivation. If the seed bed has been properly handled, disced, plowed, disced, harrowed and planted there will be few weeds to eradicate in the field. It will not be necessary under these circumstances to cultivate deep. The shallow cultivation, stirring the surface, will destroy the small weeds and conserve soil moisture, the two principal objects of corn cultivation.

Illinois Experiment Station.

F. ALFALFA.

SEEDING TO ALFALFA.

Joseph E. Wing in Breeders' Gazette.

There is no mystery or magic necessary in seeding to alfalfa. It is easy to secure a good stand of alfalfa, as easy at least as with clover and grasses, generally easier. Yet there are a few simple but quite essential points to bear in mind.

The land must be rich. If it is poor make it rich with stable manure before you sow alfalfa on it. Better manure heavily, grow then a crop of corn, keeping it clean so that no weed seed is sown in the soil, and next season sow to alfalfa. Or potatoes may precede alfalfa with good results. The land must be well drained, either naturally or by tiles. If it is very tough, heavy limestone clay, loosen it up by means of heavy manuring, else it will throw out the alfalfa the first winter. It ought to be a limestone soil. If you are off the limestone, if blue grass is not natural to your farm, do not sow alfalfa without first liming the field. Spread evenly about twenty bushels per acre of freshly slacked lime in powder form and harrow in. There are millions of acres in Ohio, Indiana, New York, Pensylvania and adjoining states where alfalfa can be profitably grown, and when once understood there is no crop of more value to the farmer, especially to the stock farmer.

It pays to give careful attention to getting a stand, as it remains in profitable growth for many years when once well started, and it greatly enriches the field on which it grows. Plow the field deeper than ever it was plowed early in winter if you can. Work it up with harrows early in spring. If you can not plow early, disking corn or potato stubble in the spring may prove better than late plowing, as it gives a better seed bed. Make a seed bed as fine as if for garden crops.

Sow a nurse-crop of spring barley, using less seed than you would usually. We have sown as little as one bushel to the acre. Sow the alfalfa in front of the drill, using fifteen pounds of seed to the acre. If your land is very rich and well prepared you may sow a little less. If the land is dry and somewhat cloddy roll it hard after seeding. If it is moist so that the rolling would pack it unduly, drag with a plank drag. Leave it smooth.

If you can get earth from an old alfalfa field in good health, sow some of this soil on the field. The barley nurse-crop subdues weeds and fox-tail grass, the worst enemy of alfalfa the first season. Let the barley ripen, and when cutting it for grain set the reaper to cut as close to the ground as possible. Should it from any cause lodge mow it off the same day and make into hay or it will smother the young alfalfa.

After the barley is taken off the alfalfa should grow up rapidly again. Watch it and if it is overtaken by yellowness of leaf, which means rust, clip it off as close to the ground as you can with the mower.

Or if weeds threaten to overpower it clip it close with the mower. Leave a strong growth in fall to shelter it and hold snow. Turn no stock on it the first season nor ever in cold weather, as tramping it in winter kills the crowns. Do not let barley shocks stand long on young alfalfa; they will kill it.

Do not be discouraged if your stand is apparently thin. If plants stand five inches apart they are thick enough.

Covering alfalfa fields in winter or late fall with manure, spread evenly, is a good thing if the land is worn. Sowing two hundred and fifty pounds of phosporus and potassium fertilizer to the acre when starting alfalfa is a good thing in some cases.

In southern soils it has been proved that drilling the phosphatic fertilizers in old alfalfa fields in spring greatly increases the yield. Doubtless in some soils applications of potassium would return large profits. Alfalfa has the power to gather nitrogen from the air, through the medium of tubercules on its rootlets. In this manner it greatly enriches soils on which it grows. Addition of mineral elements of fertility enables alfalfa to gather the more nitrogen and thus more greatly to enrich the soil. Experience of centuries in Europe proves that alfalfa is one of the greatest soil enrichers in the world. Experience in America confirms this. Alfalfa fields when broken yield heavily of corn, wheat, potatoes or whatever may be sown thereon. In many cases the increased yield is marvelous. The better the growth of alfalfa the greater the soil improvement.

When it is desired to get rid of alfalfa there is no difficulty in destroying it. It requires a good plow and team to cut through tough alfalfa sod, but once broken it dies at once. Nor is there the least danger of alfalfa spreading over fields where it is not desired. Soils on which alfalfa has grown are much better drained, more porus and mellow thereafter.

When once the field of alfalfa is established there is at hand a source of food for all live stock, better than any that has heretofore been available to the stockman. When cut before it has become woody, when cured with its leaves remaining attached to the stem, alfalfa forms a forage richer than any other in protein, that muscle-builder, milk-giver, that substance so much needed on the stock farm to develop the growing animal and to make maternity bounteous.

When once established, alfalfa is much benefited by spring culture. It may not be rooted vigorously enough for disking the second season, but by the third year it will be greatly helped by using the disc harrow as soon as the soil is in condition in spring. Alfalfa roots thrive best when they have plenty of both air and water. Disking lets in air and checks the escape of water. When grasses invade alfalfa fields the spike-toothed harrow may be used with effect to drag them out.

SPRING SEEDING OF ALFALFA.

W. S. Kelly in Twentieth Century Farmer.

As spring approaches many questions of interest to the farmer press forward and demand attention. Not the least among them is the question of spring seeding of alfalfa. Should it be pastured the first season?

Any advice on this pro or con I am sure will meet with opposition, as soil conditions are so various, climate, too, has its influence, and last but not least, the farmer's conception is so varied that dangerous ground is reached in whatever direction one goes. Hence I shall stick very closely to my own experience and observations.

First, let me state that my experience along this line has been almost wholly confined to the Missouri river bottom in Harrison county, Iowa, and my observations along the same stream from Sioux City to Kansas City, as well as in the arid regions of several states farther west where they do not pasture to any extent at any age.

On the river bottom above referred to both soil and climate seem peculiarly adapted to the growth of this plant. It grows and thrives here better than in any section with which I am familiar. In this section I am quite sure more failures occur by not pasturing when sown with a nurse-crop than from any, yes, all other causes.

When alfalfa is sown with a nurse-crop most people make the mistake of permitting the nurse-crop to ripen. Then along about the 10th of July come with the reaper and remove the crop and turn the little alfalfa plants, pale and sick unto death from strangulation, out to the merciless rays of a scorching July sun, and then wonder why his field doesn't prosper like his neighbor's. The great trouble here is the crop is removed twenty days too late to save the very plant it was intended to nurse.

Now at this point two courses are open, either of which will prove and a sufficient number of stock turned on about the 20th of May to eat the field down fairly bare by June 20th, the alfalfa will come out at a rapid pace.

Now, if oats, wheat or barley is sown as a nurse crop with alfalfa very successful. Some of the stock may be taken out and continue the grazing with the remainder or all may be removed and a good crop of hay secured later on.

I have seen both of these methods pursued with complete success. Some of the very best fields I have ever seen were sown with wheat and grazed until well along in July, and then the stock removed and a very good crop of hay secured in September.

I once secured a nice stand of alfalfa by sowing with barley and pasturing all summer. However, in this case it was necessary to use the mowing machine a couple of times to help keep weeds and foxtail grass down. I expect to treat the same piece of ground in exactly the same way this season, as an extraordinary overflow, which continued for twenty days last summer, killed it out completely.

On another occasion I sowed a nine-acre field without a nurse-crop, and mowed it off about the 20th of June and removed the cutting; then about July 1st I turned on fifteen head of grown cattle and kept them there until the ground froze up. This, too, on a very dry summer—1896. I might add this field is as good today, after all these years, as it has ever been.

Now while I am satisfied that spring seeding can be safely pastured without injury to the crop, and that it is often the proper thing to do, I do not wish to be understood as advocating the tramping of the ground when it is muddy or soft. Alfalfa will not at any age form a sod; it is in fact the loosest piece of ground on the farm.

I have never before publicly advocated the pasturing of this plant the first season, and even now I have some hesitancy in spreading the doctrine broadcast. Not that I fear grazing will injure the stand, but because stock will not graze a field evenly. Here and there, for reasons best known to the stock patches will be left almost untouched. It is these spots I fear. The grain, or in the absence of a nurse-crop, weeds will spring up and strangle the alfalfa. The mower should be used early and often on these patches. A spotted alfalfa field is an eye sore.

Mondamin, Iowa.

CONCERNING ALFALFA.

Wallace's Farmer.

We are having a great number of letters from different states describing certain pieces of land and asking whether alfalfa will grow there or not. We can not, of course, tell. Alfalfa is being grown on many kinds of land where it was not supposed that it could be grown ten years ago, or five years ago, or two years ago.

We would not try it on heavy limestone clay; we would not try it on land that needs drainage; we would not try it on land that is underlaid with a clay so tenacious and stiff that it will hold water like a dish. We do not think it will pay to go to the expense of trying it under these conditions, but under almost any other condition it is worth while. We hope it will be tried in a great many places this year. All we ask is that it be given a fair trial; that is, that the land, if plowed this spring, be plowed early and then worked down thoroughly until the seed bed has a good hard bottom and a loose surface. Where the land is in cornstalks we would not advise plowing, but disking thoroughly, then sow about twenty-five pounds of seed just before the time you would naturally plant corn.

We put it this way because any date that we might fix in April or May would not fit the various latitudes. In the extreme south of our territory we would prefer fall planting, but in the northern part, say from the Iowa line up, we would prefer spring. There will be no trouble in getting a stand if good seed is used and properly covered. That does not determine the question.

The question is, will alfalfa live through the winter, and if it lives through the winter will it grow next summer without turning yellow and losing its leaves. If the latter occurs, then examine the roots for tubercles. If you find none your soil is deficient in the nitrifying germs and the remedy is to try it again, this time furnishing the bacteria in the shape of soil in which alfalfa has grown. If it fails to live through an ordinary winter, a winter that will not kill winter wheat or clover, that answers the question in the negative, and it is not worth while to try it on that land again.

Alfalfa is invaluable west of the Missouri river and on the extreme western slope of Iowa. It is the grass of all grasses for that country. East of that it is not so valuable for two resaons: First, because red clover can be grown, which, under the conditions governing the curing of alfalfa in that section, is about equal to the alfalfa in feeding value, and fits much better into the rotation. Still, where a farmer can grow alfalfa, he should have from five to ten acres, which he can use as a hog pasture or permanent meadow, and would in this section prove very valuable property. In short, alfalfa can not take the place of clover very far east of the Missouri river, and clover can not take the place of alfalfa very far west of that river. Get this idea clearly in your heads and then determine whether nature will permit you to have an alfalfa meadow or hog pasture.

DISKING ALFALFA.

W. S. Kelly in Twentieth Century Farmer.

Two years ago I disked part of one field of alfalfa and carefully watched results. I had frequently read that such treatment would tend to thicken the stand. The machine was thrown in full disk and a heavy man placed in the driver's seat and instructed not to look behind himself at the work until he had disked over a certain portion of the field. This instruction was given because I feared if he should see how it cut up the field he would quit and come to tell me about it. As for myself, I kept out of sight. I didn't want to see it either.

As a result, on the whole, I think—in fact, know—the stand was slightly thinned out. The severed roots did not send up quite so many shoots as those left untouched. I was, however, agreeably surprised and rewarded by the increased yield. I think, on the whole, the yield was about one ton more per acre for the season (four cuttings). Where the disk was used the hay made a more rapid and ranker growth—so much so that people passing on the road frequently stopped to ask for an explanation.

I account for the extra growth by the conservation of moisture with the dust blanket formed by the disk. That season was excessively dry and hot and the high winds licked the moisture from the ground at an alarming rate. Only where the dust mulch was maintained did vegetation of any kind grow and prosper.

To confirm my belief in this dust mulch theory on the increased yield of alfalfa, I again disked a part of another field last year. The early spring of that year—1902—was very dry with us.

Now the result last year was the same as the year before, but the increased yield was noticeable only on the first and slightly on the second cutting. But the dry season turned about the middle of June to a very wet one. After the rains began to fall no difference could be noticed in the field, either while the crop was standing or in handling the hay.

From the results of these experiments I am led to believe that the yield can be materially increased by the use of the disk in a dry itme. Of course, the harrow should always follow the disk so as to leave the surface in as fine tittle as possible.

While the results of the disk have so far been very gratifying, and no ill results have thus far appeared, I have a fear, and a grave one too, that the constant use of the disk will so scar and cut the roots that disease and death must result.

However, the disk will be used on our farm until what is feared is proven true or groundless.

Mondamin, Iowa.

ALFALFA AND PROTEIN.

Breeders' Gazette.

Time was when wheat bran was almost unknown as a common farm stock food. Our older readers recall the time when horsemen and others were heard to say that bran was about as good as sawdust—no better. In those days bran was cheap and the wise ones were feeding it quietly, appreciating its value, while the great mass carefully let it alone. Then came the work of the agricultural colleges and experiemnt stations showing the food value of bran, and under this stimulus and enlightment prices have advanced until feeders are crying out to the colleges to let the subject alone and to the millers to have mercy on them. Bran has been the best advertised feeding stuff in the whole list before the American farming public, and its prices have soared accordingly.

Those who have recognized the situation and experienced the steady demand for a protein-rich food, are seeking eagerly for relief from the heavy burden laid upon them by the miller. On many farms light is breaking and relief coming through the blessed alfalfa plant, one of Nature's grandest gifts to agricultural man. This tiny plant, so insignificant in size and so helpless during its first months of growth, soon deepens its roots into the soil and spreads its beautiful foliage to the air and sunshine, gathering nutrients and piling them up into leaf and stem until great crops of rich forage are made available to the prudent, thifty farmer who is wise enough to grow this plant. Best of all alfalfa is a protein food. The chemist shows that in the leaves and fine stems of well cured alfalfa hay the protein is just about as abundant as in wheat bran. Those who feed alfalfa hay find by actual experience that the work of the analyst is fully substantiated. Alfalfa hay can be fed to horses in reasonable quantity, thereby cutting down the allowance of oats or bran these animals otherwise require. It is par excellence the food for the dairy cow and with her will practically take the place of bran altogether. The wonderful results obtained in fattening lambs on alfalfa around Fort Collins. Colo., and other leading districts, show this plant to be equally helpful in putting on the highest finish with those animals. Hogs and chickens eat the dry alfalfa leaves as though they were feeding on grain itself. This material fills up the digestive tract with a nutritious substance, often serving a better purpose than would a limited supply of highly concentrated grain.

It is all right to feed bran and middlings, but the farmer should not put himself under the yoke of the miller forever and become his abject slave when he has so grand an ally in the protein-producing alfalfa plant. Let everyone who is tired of paying from sixteen to twenty dollars per ton for wheat bran make a start at an alfalfa field. Never mind about the infected dirt. If you can get dirt from an established alfalfa field it may be wise enough to scatter it over the field, but do not let the absence of such bacteria-infected soil deter you from the attempt. Observe these simple rules: Do not sow alfalfa on wet, sour land; it must be well drained. Give it rich ground. No plant will yield such crops of forage; therefore do not be a niggard with it in the matter of soil. Make a garden seed bed. Let the weeds start and then harrow them a time or two. Sow at least twenty pounds of seed to the acre. Use beardless barley or oats as nurse crop and cut it for hay. You will thus get immediate return from your field. Or if the season supplies ample moisture the grain may be allowed to ripen. When the nurse-crop is removed keep weeds back with the mower. If you will fight the weeds the first season the alfalfa will smother them the second. Cut the alfalfa when about one tenth of the field is in bloom. Do not let it all come into bloom. Treat alfalfa as you do red clover and you will likely lose it. Let it alone to fight the weeds the first season and failure is almost certain. Do not be stingy of your care; it will abundantly repay you.

From alfalfa the farmer may secure the protein requirements for his stock at far less cost than in the past. The great problem now confronting our stockmen is the more economical maintenance of farm animals and the cheaper production of milk, beef, pork and mutton. Our study of breeding higher quality animals must parallel an equally intense study of producing on the farm so far as possible all the feedstuff our animals require.

ALFALFA ON ILLINOIS CORN LAND.

J. P. McWilliams in Breeders' Gazette.

To secure the best results for the money invested in alfalfa seed, fall plow the ground. The latter part of April, if the ground is not too wet, pulverize thoroughly and drag as fine as possible. Then sow your seed on top one half bushel to the acre and drag twice.

The first year you will lose money if you let it grow high enough to make hay, as it is far better to keep it mowed (not too low if dry), as often as it gets high enough to cut with the mower. The object is three-fold: First to kill all weeds, second to increase the growth of the root, third to increase the number of stalks to grow from the one root for the second year, or the first hay crop. The root of the alfalfa does not spread out, but goes straight down, but every time the stalk is mowed off it sends up many stalks in place of the one mowed off. I have counted twenty-four good large stalks of alfalfa, and several smaller ones, from one root thirty inches long, just thirteen months after the seed was planted.

Alfalfa will not do as well on poor, worn-out ground. Give it good rich soil. If in too wet ground it will drown out the same as timothy or clover. A dry year is more favorable for seeding than a wet year like 1902. The seed sown in 1901 made the first year more than twice the growth in root that seed sown this wet year made.

Last year we moved our first crop of the 1901 seeding the last week in May, one month before any other hay crop was fit to cut. It produced two tons to the acre. The second crop was cut just before oat harvest, yielding two tons per acre. The third crop was cut the last of August and produced one and one half tons per acre. The second week in October we cut the fourth crop, which produced one and one half tons to the acre. This is on the very best ground and six tons per acre is no small crop. What was sold brought $7 per ton in the field and could have been retailed and delivered in town at $9 and $10 per ton.

Western growers claim that timothy hay is more nutritious and better for driving and hard working horses, and I believe they are correct. But all animals get to love it upon short acquaintance. There is no waste to alfalfa, as both horses and cows eat the stalks as well as the leaves. I have never found its equal as a feed. In addition to the above field I put in small patches on five other farms the same year. After the work horses on all six farms had used the alfalfa hay one week they would at all times, morning, noon and night, eat their alfalfa hay and leave the corn and oats until the alfalfa was all cleaned up, not evening leaving a stalk in the manger. Alfalfa is a laxative and must be fed with caution until the animals get accustomed to it. For some cows and some horses it is too laxative for steady diet.

I sold the hay to four different teamsters and they were all eager to buy four times the quantity I had to sell. One teamster did complain that I had spoiled his team, as he could not get them to eat any other kind of hay. Another teamster reduced his ground corn and oats 25 per cent while feeding alfalfa hay. and said his team never gained so much or did so well as on the alfalfa hay. A third teamster said it was just what his team needed; that he had trouble for years with his horses as their manure was so dry and came from them like bullets, and that the alfalfa had loosened them up in good shape. The fourth teamster drove one horse upon a grocery delivery wagon, a heavy load because of so much rain and mud. After he had fed the alfalfa two weeks his horse gained in flesh, coat and every other way, notwithstanding he had to work six days in the week. I have used alfalfa in the fall for pasture for yearlings, both horses and calves. and have never found anything to make them grow and fill out like alfalfa.

Cut when the weather is dry and the field about ten to twenty per cent in bloom. Let it cure well in cocks or windrows. If put in barn too green it will get dusty, and it is claimed that there is danger of spontaneous combustion if the first crop is put in too green.

Alfalfa winters well in our climate, but in extreme cold winters without snow, such as we experienced about three years ago, with three feet of frost, it will winter kill the same as other members of the clover family. In the far northwest ranchers claim that water frozen on alfalfa will make a poison which is dangerous, but I have known of one field in Illinois that both horses and cattle have run over and fed on for several winters with no bad results. I believe alfalfa is just as valuable for us for pasture as for hay, and think that in a dry year like 1901 one acre of alfalfa will produce more pasture for stock than five acres of the best pasture land that we have. I expect to increase the acreage each year, and to say I am well pleased with my experiment is placing it mildly.

Livingston County, Illinois.

ALFALFA ON SANDY SOIL.

A Plain Farmer in Breeders' Gazette.

T. R. D. asks in your issue of February 4:

"Will alfalfa do well on third-bottom sandy land in Ohio? Should peas and beans be grown for two or three years before trying alfalfa?"

On ten acres of sandy clay land I drilled Whippoorwill cowpeas and soy beans in rows two inches apart, then sowed ten pounds of alfalfa per acre and harrowed the field with a section drag. For a number of years I had fed shocked corn to stock on this field and six years ago had a good stand of blue-grass, but drouth nearly killed it out. The peas, beans and alfalfa seeded May 1st came up promptly and made a growth two feet high. I let them stand until the soy bean pods began to yellow and some of the alfalfa had seeded. About August 15th I harvested twenty loads of mixed hay, of which the cowpea hay proved the most palatable to the stock and the soy beans next; the alfalfa stood too long and the stems go hard, but my steers and cows ate it well and the hogs pick up the scattered leaves.

I planted the peas and beans lest the alfalfa should fail to do well, and also with the intention of improving the soil, so that in succeeding years, if the alfalfa grew, it would be improved from the fertility added by the peas and beans. Rains came frequently and the alfalfa made a good stand, but its second crop, which I left standing for winter protection, was not so vigorous as it might have been had I mowed it early to keep down the weeds and make the alfalfa branch out and then cut a second and third time. However, it has stood the winter well thus far and as such soil is not inclined to heave I feel confident of a fine crop this year. I shall cut it three times this year just before the seeds form and feel confident that I shall have a fine crop.

The drainage from a hill seeps under the field in question and the nature of the soil will retain sufficient moisture. Hence I conclude that alfalfa will make this old field the most fruitful ten acres on my farm. I have arranged to get 1,000 pounds of alfalfa infected soil to sow on this field and 200 pounds per acre of steamed bonemeal. Adjoining the field is a bog of black soil fifteen or twenty feet deep. I shall next fall try the effect of this bog soil hauled out in manure spreaders and put on a portion of this field.

Two miles from my farm there are eight or ten acres of alfalfa on a hill, which is sandy clay soil, beneath which is a gravel bed at twelve or fifteen feet. The alfalfa is two years old and was cut three times, yielding in all about two and one-half tons. Year before last was drouth year and it did not get a good start, but was cut twice, making about one and one half tons. The third crop produced seed, which fell and materially improved the stand.

I shall try alfalfa this year as a supplemental crop on seven acres of very sandy soil, which produced one and one half tons of clover and timothy last year. I shall sow ten pounds of alfalfa per acre, disk it lightly and run a drag over it.

Rape sown with oats produced a fine tall pasture here last year, and sown with corn, when the corn was laid by on June 20th, grew two to two and one half feet high. The corn and rape were pastured down by steers before the cane ripened. The astringent quality of the rape prevented the soft corn from loosening the bowels of the steers. After the steers were yarded, the rape came up again and made good pasture during October, November and a part of December for my cows.

I intend sowing mammoth, clover and rape in that field of corn this year, and plant pumpkins with the corn. I will also plant early one of the earliest varieties of corn and turn steers into part of the field by August 1st before the flies get very bad and before the pastures get very dry, and thus grow some November beef.

Ogle County, Illinois.

ALFALFA IN NORTHWESTERN IOWA.

L. D. Hall in Breeders' Gazette.

Alfalfa is adapted to northwestern Iowa. Its value to the agriculture of this locality has been thoroughly demonstrated by several years of successful experience. While the crop is not yet grown to a great extent here, a great many farmers have by small ventures satisfied themselves of its reliability, and men who were but yesterday skeptical on the subject, are now alfalfa enthusiasts. This movement is due in no small degree to the persistence of the Gazette in spreading abroad weekly so much interest in and information concerning this wonderful legume.

What is the best way to get a catch? is the first question commonly asked. Of course the truth is there are several good ways, but whatever plan of seeding alfalfa be adopted, it is necessary to hit the thing squarely between the eyes every time. Thoroughness is more than desirable; it is indispensable. Sowing in April with beardless barley has proved a dependable method here. The field is disked two or three times and harrowed until a fine tilth is secured. Twelve pounds of alfalfa and a bushel of barley per acre have given good results.

A fact that is of evident value to the feeders and farmers of this portion of the State, where the native prairie is still used as pasture land to some extent, is that newly broken prairie can be successfully and profitably seeded to alfalfa. The difference between the producing capacity of a prairie pasture and that of a field of alfalfa is easily calculated. A seventy-acre piece here sown in that way five years ago, has been steadily producing three crops of hay yearly, yielding as much per acre as adjoining fields in which stubble and cornstalk ground was sown to alfalfa at the same time. Last year we broke a fifty-acre native pasture in June and sowed twelve pounds of alfalfa per acre after disking the ground three times. It is true that a fine seed bed was not secured in this way, but weeds do not thrive on our newly broken prairie, and our experience has been that the amount of preparation of the seed bed may be regulated about in proportion to the extent to which weed enemies must be combated. The field referred to now shows a fair stand, and is improving with each cutting, of which there are three here, the alfalfa usually being ready to mow about June 10th, July 10th and August 20th.

One of the best stands of alfalfa I have ever seen here was secured after oats. The stubble was plowed in August, 1900, turning under a lot of fertility in the form of green after-growth. The field was harrowed immediately after plowing and barley was sown with alfalfa the following April.

Alfalfa and bromus inermis have grown well together here and we are certain of the value of the combination as a pasture crop. Judging from a five-year-old field of the mixture we think the alfalfa prevents the meadow from becoming sod-bound and that the brome grass protects the alfalfa from the evil effects of tramping. The June growth makes a splendid hay crop.

The beneficial effects of manure on land which is afterward seeded to alfalfa is clearly seen in several of our fields, where a distinct line can be noticed between the alfalfa on manured and unmanured ground in the same field. In fact, the lack of manure in a portion of one of our fields caused absolute failure, the manured part of the field giving a perfect stand. The question of inoculation does not annoy us. The busy bacteria are here and, as Professor Davenport of the Illinois Experiment Station says, are 'working for nothing, boarding themselves and paying for the privilege."

Sioux County, Iowa.

ALFALFA WITH OR WITHOUT NURSE-CROP.

Willis O. Wing in Breeders' Gazette.

The season of alfalfa inquiries is approaching. In February it will be in full blast. I wish to save a few of your readers some trouble, however, in regard to the best way to sow alfalfa in the East. From careful reading of Coburn and other eminent Western authorities I find that their conditions demand different methods from Eastern, that arid soils or semi-arid soils are best sown without nurse-corps and often late in the season.

In Ohio we like to sow as early in the year as possible, say the seventh to the twentieth of April. We feel very sure, after repeated trials, that a nurse-crop sown thinly on the ground will insure a better stand and a stronger stand of alfalfa than can be secured when sown alone. I will tell you why it does better.

During the first few weeks that alfalfa is sown a myriad of tiny weeds and foxtail grass spring up. The alfalfa plants grows slowly without a nurse-crop and the weeds and foxtail are presently higher than the alfalfa and choking it. Suppose then you clip it close with a mower; some weeds are killed, others sprangle sideways and are worse than ever and the foxtail seems to thicken for the clipping. I watched a field this past summer farmed by a progressive neighbor. The field was clipped many times but the foxtail had rather the best of it in the fall.

Now then suppose you use a nurse-crop. It takes possession of the ground during the warm moist months of May and June. In July you harvest it and the alfalfa may look pretty bad. The leaves may drop off the decapitated plants. But the alfalfa has possession of the ground for the remainder of the season and grows in dry weather better than the weeds or other grasses.

Sow then with the nurse-crop and sow the nurse-crop thin on the ground. What kind of a nurse-crop? The crop that will mature quickest, preferably. We like beardless barley, but you can sow oats, but do not sow over a bushel of oats or five pecks of Champion barley or six pecks of Success barley to the acre. A neighbor raised seventy bushels of oats to the acre from a bushel of seed last year. We grew about thirty-five bushels of Champion barley this year. Both fields secured good stands of alfalfa.

When you seed allow the alfalfa seed to become covered by drill bars. It will come up though covered several inches deep with loose earth. We sometimes use a heavy roller. If the ground and subsoil are pretty dry this is all right, but with the soil in condition that generally prevails in early April, I prefer a thorough dragging. The ground is less likely to crack afterward.

Champaign Co., Ohio.

ALFALFA INOCULATION.

Breeders' Gazette.

The scientists have done great things for us, whereof we are glad. Their discoveries are worth millions to the farmer. Their future work will likely exceed their past in value to the agriculturist. Many secrets of Nature remain yet to be unlocked and the keys for this purpose are being fitted in many a laboratory. No fault can be found with their conclusions, but some care must be exercised in the application of them. Otherwise the farmer may lose some good things as he goes along.

Of surprising values are the facts dug out by the scientists concerning the fertilizing effects of the clovers and other legumes. Farmers had noted the nodules on the clover roots but did not know what they meant. The scientists showed the bacteria dwelling in these little knots on the roots of such plants and demonstrated their power to extract nitrogen, the most valuable fertilizing element, from the abundant stores in the air and fix it in the soil as available plant food. And they tell us that each legume has its own distinct variety of bacterium and that the red clover "bug" can not do the work for alfalfa or any other.

With the widespread interest in alfalfa and some reports of failure to get a satisfactory stand on the black soils of Illinois, the scientists have been stimulated to active work on this proposition. and have broadly announced that these failures have come from a want of the proper bacteria, and have advised soil-infection by the sowing of dirt taken from a well-set alfalfa field. This means of infection has been found effective, and the results have indisputably showed its value. They are therefore advising farmers to obtain infected dirt to sow on the fields on which they expect to try alfalfa. This advice is good enough in itself, but it must be considered in relation to certain palpable facts.

Primarily, infected dirt can not be obtained without destroying parts of an alfalfa field, and few men care to sell soil at such a sacrifice. Indeed, with all this discussion of alfalfa inoculation only one farmer has come forward in this journal with public offer of soil from an infected field, while requests for such soil have been many. By reason of the difficulty of obtaining infected dirt, and the insistence of the scientists on such infection, it is likely that many farmers will be deterred from attempting to grow alfalfa this year. And here is where they make a sad mistake.

Let us examine the facts. As the alfalfa bacterium is specific to that plant it follows that it does not exist except in a field where alfalfa has been grown. The only exception to this proposition would be found where the overflow of a river had carried the bacteria down stream and lodged them on low-lying ground. Years of experience has demonstrated that it is possible to get fine stands of this clover without special soil-infection. What does this mean? Simply that the seed carries the bacteria. Why then do some find success and some failure? It seems reasonable to suppose that it is on account of the character of the soil. It is known that acid soils are not suited to the growth of alfalfa. It is known that the plant will not thrive in water-logged soils. It is known that it does best on rich soil. Broadly speaking, no man has the advantage over his neighbor in the prior possession of the bacteria in his soil unless by overflow or previous seeding of alfalfa. The seed undoubtedly carries the bacteria, sometimes in larger quantities than others, possibly, but these bacteria multiply rapidly when once introduced in the soil.

The conclusion is that no man with suitable soil should hang back from a trial with alfalfa merely because he can not obtain inoculated dirt to sow on his field. Throughout the great West such a thing as soil infection in this manner is never considered. They simply sow the seed and the crop follows. This fact of itself indicates strongly that the difficulty is in the character of the soil. Enough is now known to warn farmers against the sowing of alfalfa on a field of sour, acid or water-logged soil. It is possibly to correct acidity in such fields by the use of ground limestone, and tiles will carry off the subsoil water, rendering it fit for alfalfa. But where no such adverse conditions, prevail, and especially where there is a limestone or a porous subsoil, we have no hesitancy in advising the trial of alfalfa.

If failure results, examine the soil for acidity. If this is found correct it. Then manure the ground and try again, and success is almost certain. An experience in northern Illinois recently reported to this office is of value. Alfalfa was tried a few years ago on a very poor bit of ground and the results were not satisfactory. Last year it was tried again and on every part of the field seeded to alfalfa some years ago a rank stand was secured, while on adjoining portions the stand is poor. This means that the soil was then infected and has stayed infected. Hence if failure results, repeat the experiment on the same soil unless it has been found to be too acid or too wet. If infected soil can be obtained it is well enough to sow it to make assurance doubly sure, but we do not want the scientists with their talk of inoculation to scare out farmers from trying for an alfalfa field. It seems reasonable to conclude that some soils afford more congenial home for the alfalfa bacteria than others and hence they multiply more rapidly and thrive better. But as a general rule we believe that alfalfa can be made to yield handsome crops anywhere that corn grows, uncorrected acid soils excepted.

It should be remembered that the presence of the nodules is not absolutely essential to the growth of alfalfa. It will grow without the nitrogen which they get from the air, but it will not flourish so well nor yield so abundantly as when this fertilizer is supplied by the bacteria. Manure can be made to take the place of the bacteria in a large measure and thus support the plants until the bacteria have opportunity to infect the field thoroughly.

If a farmer wishes to sow a clover crop to enrich the field in his rotation he should not use alfalfa. Red clover is much better for that purpose. If he wants a permanent meadow, yielding his protein in such quantity as he can not harvest from other crop, and hay in such weight as no other plant yields, let him put in alfalfa. And let him be generous with his soil if he wishes to be sure of a stand. The returns from an alfalfa field are so great as to warrant turning over to it the richest land on the farm.

For fear that soil infection has become a bugaboo with many farmers this sermon has been preached. No farmer with suitable soil should allow it to scare him from seeding a field to alfalfa.

G. MISCELLANEOUS.

ABORTION IN COWS.

Wallaces' Farmer.

Scarcely a week passes that we do not have one or more letters asking us what to do in case of contagious abortion in a herd of cattle. We do not know that we can do our readers a better service than to publish the directions for the treatment of an abortive herd given by Dr. Leonard Pearson, State Veterinarian of Pennsylvania, who has conducted a number of experiments and has given the subject thorough study, as follows:

"1. Burn aborted foetuses and membranes. This material carries the germs of abortion in abundance, and burning or deep burial furnish the only means of getting rid of it in a safe way.

"2. Isolate discharging cows. The vaginal discharge from cows that have aborted is very virulent and may furnish the means for infecting other cows. Hence, discharging cows should be kept apart from the herd.

"3. Disinfect the premises. This procedure should be executed with the most exacting care. Partial or inefficient disinfection is practically useless. To disinfect, where fumigation with vapor of formaldehyde can not be employed, the spray pump furnishes the best means. It should be borne in mind that disinfectants do not destroy germs that they do not come in contact with. So, all large accumulations of bedding, forage and manure should be removed and every place that may harbor a germ should be reached with the disinfectant. Especial care should be used to drive it into every crack, knothole, behind every loose board, on top of every beam, and into every partly concealed hole, as well as upon every exposed surface.

"A 5 per cent solution of good (not crude) carbolic acid may be used for this purpose.

"Following the disinfection by spraying and the cleaning of the stable it may be whitewashed with lime wash containing one pound of fresh chloride of lime to each three gallons of water. This may be applied with a brush, or, better, with a spray pump.

"The barn yards should be well cleaned out, the manure being spread in some field that the cattle do not have access to. The bottom of the yard should be well scraped and the earth stained with leachings from manure should be removed. Then the surface of the yard may be flushed with a saturated solution of sulphate of iron or thickly spread with lime. The outer wall of the barn, facing on the yard, and the adjoining fences, should be disinfected or whitewashed.

"4. Irrigate the genital passages of the cows that have aborted. The purpose of this procedure is to disinfect the genital passages. A convenient method is as follows: Hang a bucket containing the antiseptic solution back of the cow. To a spigot on the side of this bucket attach a rubber hose five eighths of an inch in diameter and about six feet long. Insert the hose in the vagina, and, if possible, into the uterus of the cow. Allow from three to four quarts of the warm solution to flow into the cow and out. Take a fresh hose and irrigate the next cow, allowing the first hose to soak in an antiseptic solution in the meantime.

This treatment should be repeated every second or third day so long as there is any discharge from the cow. Afterwards it may be used once or twice a week. As appropriate solutions the following are recommended: Lysol, 1 per cent; creolin, 2 per cent; bichloride of mercury, 1-3,000; carbolic acid, 1½ per cent; boracic acid, 3 per cent; permanganate of potash, 1 per cent; alum, 1 per cent; chloride of zinc, 2 per cent. The last injection, two days before service, should be bicarbonate of soda, 2 per cent.

"5—Irrigate the sheath of the bull. The purpose of flushing out and disinfecting the sheath and the outside of the penis of the bull is to prevent him from carrying the germs of abortion from one cow to another. This procedure should be enforced before and after each service. This is very important. The sheath may be flushed by using a small rubber hose and funnel. The end of this hose is to be inserted into the sheath beside the penis, the foreskin is held together with the fingers and the antiseptic is poured into the funnel. A 1 per cent solution of lysol is good for this purpose.

"6. The long hair at the end of the bulls sheath should be cut off. Moreover, it is well to clip the hair from under the belly over a circle one foot in diameter surrounding the opening of the sheath. Then, by washing with a sponge this area can easily be cleaned before each service.

"7. Wash off the external genitals of each cow every day. For this purpose use any of the antiseptics recommended above. They can be applied with a clean sponge. The parts washed should comprise the root of the tail, the anus, the vulva and the surrounding skin for a distance of several inches, and the corresponding portion of the tail. A separate bucket and sponge should be used for the cows that are pregnant and those that have recently aborted.

"8. Do not breed a cow for ten weeks after she has aborted. About ten weeks are required for the thorough treatment of a cow that has aborted, and she should not be bred before the expiration of this period. If she shows any discharge or other indication of vaginal catarrh she should not be bred for a longer period, or until the parts are in an entirely normal condition.

"9. A solution of carbolic acid may be administered subsutaneously to each pregnant cow. For this purpose use a 3 per cent solution of carbolic acid and of this inject two drams every ten days. Should this cause swelling in some individuals for these use a smaller amount.

"10. Remove cows from the herd before they abort, if possible. The purpose of this is to prevent the re-infection of the premises. Of course, this cannot always be done, and when a cow aborts in the cow stable thorough disinfection is again required.

"11. Repeat the disinfection of the stable from time to time and pay particular attention to the cleansing and disinfecting of the gutters. For frequent flushing of the gutters use a saturated solution of sulphate of iron.

"12. Treat the cows according to their individual needs. If a laxative or tonic is needed, give Sal. car. fact. or iron or arsenic, according to the indications.

"13. Whenever possble it is well to use a separate bull for the cows that have aborted and another for the sound cows. But even in this case it is important to observe the precautions cited under heading No. 5—using a separate apparatus for each bull."

If the reader is not willing to take the trouble to follow the above directions, then probably the best thing he can do is to fatten his cows and sell them.

MANURING HILLY LAND.

The Farmer.

In making a journey recently southward we noticed that in some sections where the land was more or less rolling, some of the farmers had drawn out manure and spread the same over the tops of the hills, extending the application some distance down the sides of the same. The plan is unquestionably a wise one. as in such soils the process of carrying fertility downward toward the valleys is ever present in a greater or less degree.

If the manure were spread over all the land, the latter portions would get far more than their rightful share, and as a consequence there would be some unevenness in the growth of the crops that characterizes them when the hills are not sufficiently supplied with fertility. There is a further advantage in applying manure thus. namely. that if the soils are light it helps to bind them and thus prevents ther lifting to such an extent with the wind. Moreover, when grasses and clover are grown upon them, it has a tendency to protect the plants from the severity of the weather.

We are pleased, indeed, to note the attention that is thus being given to the judicious application of farmyard manure in some parts of the State. We have said again and again that in no part of the United States are better returns reaped from the application of farm yard manure than in this Northwest. Of course this statement implies that the fertility must be judiciously applied. There is constant room for the exercise of judgment in applying it. Of course it would be possible so to apply it that in some instances it would dry out the land too much, at least in growing the first crop after it had been applied. In other instances it could be applied so excessively as to practically ruin the grain crops following. There is always a right and wrong way for doing things of this kind and we know of no question more worthy of intelligent thought than the application of the fertilizers made upon the farm.

COST OF PUTTING UP ENSILAGE.

F. D. Pierce in Wallaces' Farmer.

I have noticed recently several letters in the *Farmer* relating to the cost of putting up ensilage, and I thought possibly my experience along that line might be of value. Nine years ago I built my first silo, which has been filled every year since, and now I have four to fill with a capacity of about four hundred and twenty-five tons. These are situated on two adjoining farms which I rent upon the share plan. One tenant keeps two helpers throughout the season and the other one helper. This makes five men altogether. To these we add two day hands, which completes the force. I furnish a ten-horse power gasoline engine and a self-feeding cutter with a twenty-eight-foot elevator to do the work. One man does the feeding and attends to the engine (which requires almost no attention after once oiled and started), another man works in the silo, a third runs the corn harvester, and the other four with teams and low-down wagons do the hauling. The harvester we have used for the past five years in all kinds of corn with perfect satisfaction. The corn is bound and we do not have to cut the bands as the machine will take care of it perfectly without.

With this force we put up about forty tons on an average per day, besides milking about fifty cows. In 1902 we filled a silo that holds one hundred and twenty-five tons in two and one fourth days' running time, and one holding one hundred and thirty-five tons in two and one half days. We keep no more horses on the farms than we would did; we put up no silage, and have to hire only two extra men for ten or eleven days. In that length of time we harvest from thirty-five to forty-five acres of corn, taking the entire crop from the ground and leaving the ground ready for the plow.

The cost may be figured in different ways. Were we to charge $3.00 per day for man and team and $7.00 for cutting machinery and fuel, and $2.00 for the corn harvester, and $1.50 each for the men without teams, it would stand thus: Five men with teams, $15.00; two men without teams, $3.00; cutting machinery, fuel, and harvester, $9.00. Making a total of $27.00 for putting up forty tons of silage, or an average of sixty-seven and one half cents per ton, or about $6.75 per acre one year with an other.

But the extra expense over handling the crop in the old way is about $12.00 per day for about eleven days, with the result of four hundred and twenty-five tons of silage at thirty-one cents per ton, or $3.10 per acre for the two fifths of the crop that would be in the old way to go to waste. A test at one of the experiment stations has shown that an acre of average corn put through the silo will make as much beef as $32.90 worth of feed fed in the usual way. Two fifths of this is $13.12, making pretty good returns for an outlay of $3.10.

Black Hawk County, Iowa.

RAPE GROWN IN GRAIN FOR PASTURE.

Prof. Thomas Shaw, in American Sheep Breeder.

This method of growing rape pastures in the West is becoming very popular, so much so that many farmers in grain-growing areas now sow rape in nearly all the grain they grow. They then purchase lambs and bring them from the West, or they gather them up where they can, and make them ready for market on the grazing furnished by the rape. The methods of sowing are various, and by many are not well understood. A discussion of the question, therefore, should prove helpful to some at least.

The rape plant can not by any means be grown thus with equal success on all kinds of land. On stiff, hard clay it would make but little growth, even though a stand of the plants could be obtained. The same is true of infertile soils too poor to grow a crop of grain other than rye. in good form. Then there are grain-growing lands on the border of the semi-arid country and elsewhere in which the soil is so light as to lift with the winds, on such soils it is not easy to get a good stand of the plants should the season turn dry. But on the average prairie soils under average conditions, a stand of the plants may be obtained almost any season.

Some growers sow the seed on these soils along with the grain. The plan is excellent in a season of normal growth, unless the soil be very rich. When sown thus the seed is just mixed with the grain. Usually it is mixed in the grain box. A bag of grain is put into the grain box and then a little seed, enough for an acre or so is poured along the grain from end to end of the box, and a little mixing follows with the hands. This means a little delay in sowing, but it is not a serious delay. On soils consisting mainly of clay this plan would not work very well. The seed would be buried so deeply that it would not come up, but it is not so with prairie soils. It will come up readily even though buried two and a half to three inches deep. With drills which have a grass seed attachment the seed may be sown in fine form the same as grass seed. The attachment should be in front of the grain tubes.

In a normal season and on average prairie soils, the rape plants will remain so small as not to injure the grain, while it is being grown, or to interfere with the harvesting of the same. But in a season of much growth, the rape plants become so large as to make the cutting and curing of the grain more or less troublesome. This will be so in all, or nearly all, instances in which the grain lodges, and it will be so in many instances in a barley crop whether it should stand or lodge, since the shade furnished by the barley is not so dense as the shade furnished by oats.

Because of this hazard that the rape-plants may thus give trouble in harvesting the grain, some are beginning to practice sowing the rape seed a little later. Happily, this is being made entirely practicable on prairie soils, but the introduction of the weeder. This implement is surely a godsend to the farmers who live on the weedy, grain-growing prairies of the West, if they will only use it as they may. It is the firm conviction of the writer that if farmers will run the weeder once or twice over their grain fields at the proper season they will add many bushels in the aggregate to the yields of the crop. This makes it easily possible to sow the rape seed a little later than the sowing of the grain, and to cover it with the weeder. As the weeder will far more than pay for its use in the benefit resulting to the crop, the covering to the rape seed comes without any cost. But of course the seed must needs be sown by hand or by a hand machine. When thus sown, the rape plants do not get so large as to injure the grain crop. On the other hand, should dry weather follow, the hazard of failure to get a stand of the plants is increased.

Rape seed may not only be sown on spring crops, but it may also be sown on winter crops, such as winter wheat or winter rye, and in the

South also on winter oats and winter barley. When sown on these the seeding should not be done too early. When thus sown the harrow should be used to cover the same. Because of the impaction of the soil the weeder will not ordinarily provide a sufficient covering. The harrowing thus given to the ground, if judiciously done, will also be peculiarly helpful to the grain crop. When rape seed is thus sown on winter grain crops, it should produce pasture both early and ample when the grain is cut, since it is removed so early in the season.

The amount of seed to sow varies. It runs all the way from one to two pounds. On good soil the smaller amount of seed is sown. On soil not so good the larger. It would probably be correct to say that one and a half pounds would be an average amount to sow. No advantage follows over-thick sowing, especially in a dry season, as the plants in the contention for moisture do not grow as large as when they do not grow too thickly.

In some seasons the amount of pasture thus furnished is very great. In other seasons, as when the drought is excessive, the results may be disappointing. In fact the stand of the plants may entirely fail, but this does not often happen. Under some conditions an acre of such pasture will grow rape enough to fatten half a dozen sheep and lambs. The pasture is also less liable to produce bloat than rape grown by itself, since other plants grow up in the rape and these will be eagerly eaten by the sheep. All weed seeds growing in such pastures will be consumed. There are some objections to the system, especially in the West. To be effective fencing is wanted. On many grain-growing farms there are virtually no fences. It is the custom also to plough much of the land intended for grain, at least in the Northwest, as soon as practicable after harvest. Where this is done it does not give time for rape plants to develop or to be grazed down after harvest. Moreover, where lands are sown to grass it would not be a good plan to sow rape thus for grazing, as the close cropping in the autumn would be much against the safe wintering of the young grass plants.

Nevertheless the opportunity is furnished for growing almost endless pastures for autumn grazing in this way.

Some farmers, for instance, in Minnesota, who sow five hundred acres or thereabouts to grain, fatten more than one thousand lambs upon the rape grown thus upon the same every season or almost every season. In fact they look upon the revenues produced from the rape as being in itself quite a profit and is obtained without lessening the fertility of the land. It is also very beneficial because of the influence which it exerts on the destruction of weeds.

SOWING SORGHUM.

Homestead.

To those who are not familiar with the merits of sorghum we will say that the crop yields abundantly if properly put in and that the hay or fodder is relished by all kinds of farm animals. The argument is sometimes made that where one has an abundant supply of corn fodder there is little need for putting in a crop like sorghum, and, while to a certain extent this is true, yet there is always some advantage in having a variety of fodders to feed during the winter.

Sorghum is a southern plant and should not be sown until the soil is warm. Generally speaking, it is just as well to delay seeding until after the corn crop is in. As the seed is comparatively small it will always pay to thoroughly prepare the ground. A clover meadow plowed in the spring and afterwards thoroughly worked down with the disc and harrow makes a most excellent seed bed for sorghum. In case the soil is rich there is more or less danger of lodging, but as sorghum is a gross feeder the yield will be about in proportion to the supply of available fertility. Where the aim is to secure the greatest possible weight per acre we believe it will generally pay to add a little farm yard manure unless the soil is naturally very rich.

The crop may be put in in rows about the same distance apart as corn rows, in which case the ordinary grain drill is used and the seed sown very thickly in the row. As the seed is small, it will require only a few quarts of seed to sow an acre in this fashion. When the crop is seeded in rows it is usually cultivated much in the same way as corn, and it may be harvested with the ordinary corn binder. Possibly the greater ease in harvesting is the best argument that can be given for sowing the crop in rows, the disadvantage of this method being that the stems of the sorghum will not be so small as if the seed is sown broadcast and a larger amount used per acre.

Where no drill is at hand we would advise using at least eighty pounds of seed per acre, and so much the better if one hundred and twenty pounds of seed per acre can be used, because the fodder in this case will grow much finer, and on account of this there will be much less waste when it is fed. Care should be taken to insure a good covering of soil, and unless the season is unusually wet it will be advisable to cover the seed to a depth of two or three inches. If the soil is fairly firm and fine on the surface we would much prefer discing in the seed to harrowing it. When sorghum is sown broadcast in this manner it is necessary to cut with a mower, or in case the soil is light it may be possible to handle it with the ordinary self-binder, in which case it may be shocked similar to a grain crop.

FARMING ON $100 LAND.

Wallaces' Farmer.

It has been a long time since farmers west of the Mississippi have made as much money on paper as they have made in the last two years. They have seen their land advance on an average of about twenty dollars per acre without crooking a finger or winking an eye. A man with a half section can easily count himself six thousand dollars richer without exuding a drop of sweat or soiling his hands. All this makes the western farmer exceedingly hopeful and optimistic and he is prepared to listen to the prophecies of the city editor who tells him that every acre of good land in Iowa will soon be worth one hundred dollars and land in the adjoining states will increase in the same proportion to its present value. A good many who are skeptical on this point have embraced the opportunity and cashed in; that is, have sold their lands at high prices and invested in cheaper lands, hoping for a similar streak of good luck some time in the future, or put it out at interest, or let it lie as a heavy mortgage at interest on the land sold.

Without repeating what we have said before as to the causes of this advance, it may be well to remark that whether land will remain at the present prices depends after all on its productive value; that is, on its ability to pay the rate of interest which other first class securities, such as railway or city bonds, bring in the market. If it can be so farmed that it will produce this amount of income either as rent or interest plus the labor and care involved in looking after it, then it will remain at that price; that is, land that will yield four dollars per acre on the investment is worth one hundred dollars as long as first mortgages on railroads yield 4 per cent. If, however, the railroads should be compelled to pay 4½ per cent, then the land must pay four and one half dollars per acre to be worth one hundred dollars.

Many of our readers may not see the connection between land and railroad bonds. The connection is just this: Money will seek investment where it can get the highest rate of interest with undoubted security and will change from one investment to another provided it can secure a greater return. The price, therefore, which land maintains permanently will depend on the net income that it yields.

It is, therefore, very easy to see that if land is to maintain the present high prices, it must yield in average years a greater return than it has in the past. Therefore, if these paper values are to be made real by the men who still own their farms, they must do a good deal better farming than they have done in the past. It is needless to say that any system of farming that allows land to lose its fertility and become less productive must sooner or later fall in price, and the farmer will find these paper values vanish if he holds his land and fails to farm it in such a way that it will yield the largest possible returns. This opens up a subject entirely too wide for discussion in any one issue. We have room only for a suggestion or two.

If the farmer so improves his methods that for ten years to come the land produces ten bushels of corn per acre more than it has done in the ten years past, he will have more than covered the increase in price. We are having the boys figure that out, therefore, we will not state how much an average yield of ten bushels additional per acre puts into the actual price of the land. The same may be said of land in wheat. If he can so improve his seed bed and his seed that instead of growing fifteen bushels, as in the past, he can grow twenty bushels in the future he need not fear that his paper profits will vanish. If he can so improve the breeding of his cattle by the purchase of thoroughbred sires and grading up, these cattle will give twenty per cent more for the corn and grass they consume and he has nailed down his paper profits so long as he secures these results.

Another way of nailing down these paper profits is to study the balanced ration and learn how to get the full feeding value of every kind of grain or grass grown on the place.

In short, whether land retains its present high prices or not depends more on the farmer than on anything else. The rise or fall in interest may affect him, the general prosperity of the country may affect him, the mutations of politics may change more or less the value of his land from year to year, but if he can increase the actual productiveness of his farm in bushels and tons in proportion to the increase in prices during the last two years, he need be in no hurry to cash in and move to town, live on the interest of the money and possibly shorten his days. For a man who has been active, energetic and pushing can not afford to quit until he is from sixty to seventy years of age, and even then he ought to keep in close touch with the farm and the boys.

SMUT IN OATS.

Wallaces' Farmer.

We do not know that we can add anything to what we have been saying during the past year. Buy a pound of formalin, which, as our old readers know, is a 40 per cent solution of formaldehyde, and can usually be bought at the drug store. Put a pound of this solution into from forty to fifty gallons of water, spread your oats in a thin layer on the barn floors, and sprinkle them with a common sprinkling can or a spraying machine, using from one to two gallons per bushel of grain, then put on more oats and sprinkle again, then shovel them into a long pile, say eighteen inches deep, and over this spread gunny sacks or any other covering convenient, and let it remain over night. The next day spread out on the floor, so as to dry out.

This treatment should not be undertaken in freezing weather. It should be attended to, however, in good weather in March, or at least previous to the time of sowing. Treated in this way, and dried out by shoveling around, they can be sown as usual. When we began investigating this subject, we were of the opinion that oats from seed treated this year would not need treatment next. In this, however, we were mistaken. This treatment, if the formalin is fresh and properly applied, will almost, if not entirely free it from smut. The oats will grow much more vigorously than that not treated, and will yield from five to fifteen bushels more per acre. It is foolish for any man to sow oats without first treating them for smut, the fact being that smut destroys from 10 to 20 per cent of the untreated oats sown in any of these central states every year, and sometimes as high as 30 per cent. Not one farmer in ten understands the amount of loss he suffers from not treating his oats now that an easy method has been devised.

We did not much blame farmers for not treating their entire seed crop for smut when there was no method available except the Jensen hot water treatment. This is effective, but it requires very particular work, must be done the day before sowing, and as oats treated with hot water cannot be sown through an ordinary drill, to treat an entire crop in this way would involve labor which the farmer cannot spare. The formalin treatment costs but little except careful work, can be done in advance, is equally effective, and the time has gone when there is any excuse for sowing untreated oats.

If our readers do not believe this, let them go ahead the old way, and after their oats head out, let them go into the field with a hoop off an old bucket, let it drop into the standing grain, then count the entire number of stalks enclosed within the hoop, then count the number of sick heads. To these add the number of undeveloped heads which show weakness, and they will learn something that will be to their advantage ever after.

Just now, for the sake of new subscribers, we will say again that the oats smut is sown with the grain, that the smut spores cannot be discovered with the naked eye, that when the oats germinate they germinate, that the smut plant grows inside the oats stalk and by the time the oats head out and are forming seed, these smut plants take possession of more or less of the heads, blight them, and are blown by the wind into the rest of the field and into the neighbors' fields. The smut growing in the oats plant so weakens it that in many cases it does not make its full growth, in some cases does not head at all, and in other cases sends up a very short, immature head. The time for birth came, but there was not strength enough to bring forth.

Any man who will try the experiment and notice the superior thrift of his treated oats, the scarcity of undeveloped heads, the vigorous growth and greater yield, will be convinced of what we are now trying to tell him and which he must either take on faith or learn by his own experience. This smut treatment is no longer experimental. We have published numbers of letters from men who have tried it over large sections of the country and in only one case was failure reported and this was due to formalin that had been standing a long time and was of insufficient strength. If farmers in any neighborhood will adopt this method, it will not be difficult to secure the services of an efficient druggist who will prepare the formalin, have it fresh, and sell it at a reasonable price.

It is well to state that this treatment is not efficient for corn nor for the loose smut in wheat. An efficient remedy for these has not yet been discovered. The stinking smut, that is the smut in wheat that leaves the grain apparently all right in shape but a mass of black spores, can be prevented by the use of sulphate of copper, or blue stone, in which very few wheat growers need instruction.

THE APPLE ORCHARD.

Farmers' Tribune.

The census bureau collects a vast fund of information about the resources and productions of the United States, which show us just what we are doing along certain lnes of industry. While we are made familiar with the production of the grains and live stock, the output of our factories and the extent of our foreign and domestic commerce, but few people have any conception of the extent and value of the apple crop of the United States.

From the statistics of our exports last year, we learn that 459,719 barrels of fresh apples and 15,664,468 pounds of dried apples were exported, with a total valuation of $2,819,479. From the census report, we learn that there were in 1900, 210,000,000 trees in the commercial orchards of the United States and these do not include the trees in the villages and gardens of the country, but only those which are kept for raising apples, to be sold in the markets of the country.

There was a great impetus in raising apples from 1890 to 1900, the increase in apple trees being over 75,000,000, and the yield from the commercial orchards for the year 1890 was over 175,000,000 bushels. Dividing the country into districts, we find that the North Atlantic states have 29,500,z00 trees; the South Atlantic States, 25,500,000; the North Central States, 92,000,000; the Southern Central States, 31,000,000, and the rest of the country 13.000,000. This gives the North and South Central districts 123,205,000 trees—nearly three fifths of all the apple trees in the country. The principal apple growing states have the following number of trees:

	No. of Trees.
New York	15,054,832
Ohio	12,952,625
Pennsylvania	11,774,211
Michigan	10,927,899
Missouri	20,040,400
Illinois	13,430,006
Virginia	8,190,025
Kentucky	8,757,238
Indiana	8,624,539
Arkansas	7,486,145
Kansas	11,848,070
North Carolina	6,438,871
Tennessee	7,714,053
West Virginia	5,441,112
Iowa	6,869,588
Total in fifteen states	201,794,764

These states during the last two years produced the following number of bushels of apples:

	1901	1902
New York	13,628,082	36,166,833
Ohio	16,935,774	14,726,760
Pennsylvania	14,507,153	19,814,648
Michigan	8,060,191	16,991,754
Virginia	12,975,112	7,533,936
Missouri	6,125,196	10,023,048
Illinois	5,648,096	9,354,659
Kentucky	8,226,819	5,898,474
Indiana	7,561,650	6,351,786
West Virginia	7,351,548	5,333,476
Tennessee	7,089,150	5,529,537
Arkansas	3,798,850	5,318,390
Kansas	3,649,422	5,461,024
North Carolina	8,065,280	7,561,200
Iowa	3,129,875	5,724,350
Total number of bushels	126,752,198	161,789,875
Total number of barrels	42,250,732	53,929,958

The years 1901 and 1902 were poor apple years, the crop in the former year being only 42 per cent of an average crop. and in the latter, 54 per cent. In the year 1900 these same states raised 207,402,004 bushels, or 69,134,001 barrels, and that year the crop was only 69 per cent of an average crop.

From the above tables it will be seen that it is not always the State that has the most trees that raises the most apples. Thus Missouri has almost twice as many trees as has Pennsylvania, and yet it only raises about half as many apples. This can be acounted for from the fact that most of the trees in Missouri are young trees, while those in Pennsylvania are large trees.

The same thing will be seen in comparing Missouri and New York. Missouri has a third more trees than New York, and produces less than one third as many apples. Michigan and Missouri present the same conditions. Iowa only has three tenths as many trees as Missouri, and raises over half as many apples.

There is a great difference in the different parts of the same State as to their adaptability to raise apples. Thus certain parts of Illinois, Missouri, Michigan and our State and adaepted to apple raising, while other parts will not grow them successfully. So well has this been ascertained, that there are now thirty-five counties in the United States which have over 400,000 trees each, while other counties in the same states do not have enough to supply the home demand. The following are the ten counties in the United States which have the most trees:

	No. of Trees.
Benton county, Arkansas	1,613,365
Washington county, Arkansas	1,555,146
Niagara county, New York	929,086

	No. of Trees.
Wayne county, New York	796,610
Marion county, New York	795,188
Monroe county, New York	789,409
Clay county, New York	751,727
Erie county, New York	631,283
Orleans county, New York	604,401
Wayne county, Illinois	604,215

It will be seen that three states contain these ten great apple producing counties, and that New York contains five of them, Illinois three and Arkansas two, although Arkansas' two counties contain almost as many apple trees as does New York's five counties.

This apple question is an important one, and the industry is receiving more attention each year. Better trees are being selected, and they are receiving more attention than formerly. Spraying is having a beneficial effect, and the outlook for apple culture is good.

POTATO CULTURE IN GERMANY.

Chicago Record-Herald.

B. H. Warner, consul at Leipzig, Germany, has recently made an interesting report to the government at Washington on the production of potatoes in Germany. The most striking thing in the report is the wide difference in the production per acre between Germany and the United States. It shows that Germany's farmers raise more than twice as many potatoes per acre as the American farmer does.

Although Consul Warner makes no explanation of this fact it is easily explained. The Germans are better farmers than Americans. They have small plots of ground instead of many acres and are of necessity compelled to get the most out of the ground that is possible by the highest cultivation. Nothing is allowed to go to waste that can be used as fertilizer and the greatest care is taken in the selection of seed and the preparation of the ground.

Most of the small farms in Germany are worked by the spade, the hoe and the hand rake, and the soil is always in the most perfect condition. German soil is no richer than ours and it has been worked much longer, but it is made to produce more by intelligent and thorough cultivation. American farmers may find a lesson in the following figures:

America.

	Acre.	Bushels.	Ave. per acre.
1899	2,581,353	228,783,232	88.6
1900	2,611,054	210,926,897	80.8
1901	2,864,335	187,598,087	65.5
1902	2,965,587	284,632,787	96.0

Germany.

	Acres.	Bushels.	Ave. per acre.
1899	7,737,845	1,411,160,740	182.37
1900	7,953,597	1,488,128,290	187.11
1901	8,200,833	1,785,199,570	217.68
1902	8,907,465	1,593,621,076	199.01

The enormous production of potatoes in Germany, as compared with the United States and the comparative prices are interesting. Prices in the United States are nearly double those in Germany, and the value of the product per acre is shown to be $44.78 in Germany, against $41.21 in the United States, in spite of the fact that the production in Germany is twice as large.

There is an overproduction of potatoes in Germany, while the reverse is true of the United States, the supply being unequal to the demand. Potatoes are used more for food in Germany, people subsisting almost entirely upon potatoes and coffee.

An enormous amount of potatoes is also consumed in various manufactures, seven eighths of all the alcohol of that country being distilled from this vegetable. Many of the large farms maintain distilleries for the utilization of the crop. The manufacture of starch and glucose is also another important factor in the consumption.

PLOWING BY RULE.

Homestead.

A good deal of plowing that is done in the corn belt may well be described as belonging to the corduroy order, and this we believe may be given as one reason why the corn crop in this belt, where conditions are almost ideal, only averages between thirty and forty bushels per acre, taking it for a number of years in succession. Young men should be encouraged to take greater pains when working with the plow, not only because skillful work of any kind is better for the worker than that which is performed in a slipshod manner, but from the utility standpoint. A crop on any land will be better after good plowing than on poor plowing. A plowing match was recently held near Brandon in the Province of Manitoba, under the auspices of a Farmers' Institute. In passing on the work the judges adopted the following scale:

Crown	13
Straightness	15
In and out at ends	5
Evenness of depth	7
Width of furrows	8
Evenness of top land	10
Covering of weeds	30
Finish	12
Total	100

In the above scale the first item, "Crown," refers to the first four or six furrows in the land. If properly laid, these should be but very little higher than the balance of the plowing. By making a high ridge there, one is only making obstruction for all forms of machinery that pass over the field afterwards, by throwing up heavy furrows on the start. If the intention is to plow four inches deep the first furrows should be more shallow than this. Straightness is essential, inasmuch as it is impossible to plow of uniform width unless the furrow slices are cut straight. The workmanship throughout the land will not only be better if the furrows are straight, but there will be a material advantage at the finish, as in this case there will be no turning in the middle of the field to take out partial furrows. By letting a plow in at the same distance from the end and out at the other end in the same way, the field not only looks better, but it enables the workman to complete the work when plowing the head land in much less time and in much better fashion than if the ins and outs are rough. It will usually pay to draw a straight scratch along each head line, using these as signals for putting in and taking out the plows. No surface can be kept in good condition unless it is plowed of uniform depth each time. This does not mean that it must be plowed the same depth every time, but rather that each plowing should be uniform throughout. Evenness of top of land refers to the same matter as touched on under the heading of Crown. It means, as there alluded to, that the crown furrows shall not be laid so as to make a prominence on the surface when the work is completed. In order to properly cover weeds furrows must be turned somewhat flatly or else a jointer of some kind used in order to bury the trash. A good finish means that a furrow of uniform width should be turned at the last, and that this should be laid over as perfectly as any other furrow and that it shall not be deep.

A scale such as the one given above simply calls attention to the various points that should be kept in mind by the plowmen. If in the past one has been in the habit of doing the work carelessly it cannot be expected that anything like perfection can be approached upon the first attempt to do better. When we advise more skillful plowing we have specially in mind the boys and young men. These should be encouraged to take pride in their work as before indicated, because of the effect upon themselves, saying nothing of the benefits to be derived from skillful workmanship in the increase of crops. The cut-and-cover plowing should be made a thing of the past and its place should be taken by workmanship involving the clean cutting and laying over uniformly without buckling of every furrow.

LIVE STOCK OF THE WORLD.

Farmers' Tribune.

The Tribune has received a number of letters complimenting it on the article, "The Meat Supply of the World," and asking it to publish the number of horses, cattle, sheep and hogs in the different stock countries of the world, so they can see how many of each the different countries have and can also compare them with the United States. We gladly do so, giving the number of horses, cattle, sheep and swine in the different countries, other than Great Britain, up to the time the latest reports are available:

Countries.	Horses.	Cattle.	Sheep.	Swine.
Algeria	204,761	1,045,102	7,523,763	88,085
Argentina	4,446,859	21,701,526	74,379,562	652,766
Austria	1,711,077	9,506,526	2,621,026	4,682,734
Hungary	2,308,457	6,738,865	8,122,682	7,330,343
Belgium	241,553	1,657,494	235,722	1,005,501
Bulgaria	343,940	1,767,974	6,808,291	461,635
Denmark	449,264	1,743,440	1,074,413	1,178,514
France	2,903,063	14,520,832	20,179,561	6,740,405
Germany	4,184,009	19,001,106	9,672,143	16,758,436
Holland	284,900	1,646,500	755,400	737,600
Italy	741,739		....	....
Japan	1,586,891	1,433,583	....	....
Roumania	864,746	2,589,040	5,644,210	1,709,909
Russia in Europe	19,681,769	32,913,228	49,643,410	11,370,511
Russia in Poland	1,383,908	3,003,629	12,548,031	1,259,001
Russia in N. Caucasia	1,020,550	3,515,590	9,033,175	134,447
Servia	180,871	942,087	3,013,644	940,609
Spain	397,172	2,217,659	13,359,473	1,927,864
Switzerland	124,896	1,340,375	219,438	555,261
Sweden	525,256	2,583,065	1,282,786	810,839
Norway	150,898	1,006,499	1,417,524	121,057
United States	19,285,461	61,764,433	63,964,876	46,922,624
Uruguay	561,408	6,827,428	18,607,717	93,923

From the above it will be seen, except in horses and sheep, the United States leads all the nations of the world in the number of the different kinds of domestic animals. Russia surpasses her in the number of horses, but it must be remembered that Russia is two and one half times as large as the United States. We have about twice as many cattle, a third more sheep and four times as many hogs as Russia with times as many cattle, seven times as many sheep and nearly three times as many hogs as Germany. It is not believed that Argentina has more sheep than the United States. Certainly the United States stand out among the nations of the earth as the greatest live stock country on the face of the globe.

INFLUENCE OF HEIGHT OF WHEEL ON THE DRAFT OF FARM WAGONS.

Successful Farming.

The Missouri Experiment Station has been doing good work for the farmer in making tests of the relative draft of farm wagons and carts under varying conditions as to height of wheels, width of tires, macadam, gravel and dirt roads, in all conditions, and on meadows, pastures, cultivated fields, stubble land, etc. The results of many of these details have just been published in bulletin form by the Station. The draft was determined by means of a Giddings self-recording dynomometer. The net load and in every case the same, viz., 2,000 pounds. Three sets of wheels of different heights, all with six-inch tires, were used as flolows: Standard front wheels forty-four inches, rear wheels fifty-five inches. Medium, front wheels thirty-six inches, rear wheels 40 inches. Low, front wheels twenty-four inches, rear wheels twenty-eight inches. Without going into the details of the trials contained in the bulletin, for want of space, we quote the following summary given by the author, Mr. T. I. Mairs, assistant in agriculture:

First—For the same load, wagons with wheels of standard height drew lighter than those with lower wheels.

Second—The difference in favor of the standard wheels was greater on road surface in bad condition than on good road surfaces.

Third—Low wheels cut deeper ruts than those of standard height.

Fourth—The vibration of the tongue is greater in wagons with low wheels.

Fifth—For most purposes wagons with low wheels are more convenient than those of standard height.

Sixth—Wagons with broad tires, and wheels of standard height, are cumbersome and require much room in turning.

Seventh—Diminishing the height of wheels from thirty-six to thirty-five inches in front and forty-four to forty inches in the rear did not increase the draft in as great proportion as it increased the convenience of loading and unloading the ordinary farm freight.

Eighth—Diminishing the height of wheels below thirty inches front and forty inches rear increased the draft in greater proportion than it gained in convenience.

Ninth—On good roads, increasing the length of rear axle so that the front and rear wheels will run in different tracks to avoid cutting ruts, did not increase the draft.

Tenth—On sod, cultivated ground and bad roads wagons with the rear axle longer than the front one drew heavier than one having both axles of the same length.

Eleventh—Wagons with the rear axles longer than the front ones require wider gateways and more careful drivers, and are on the whole very inconvenient and not to be recommended for farm use.

Twelfth—The best form of farm wagon is one with axles of equal length, broad tires, and wheels thirty to thirty-six inches high in front and forty to forty-four inches behind.

A knowledge of the above facts is important to farmers who are desirous of doing the best work with their wagons and at the same time conserving the energy of their teams.

VALUE OF IOWA LAND.

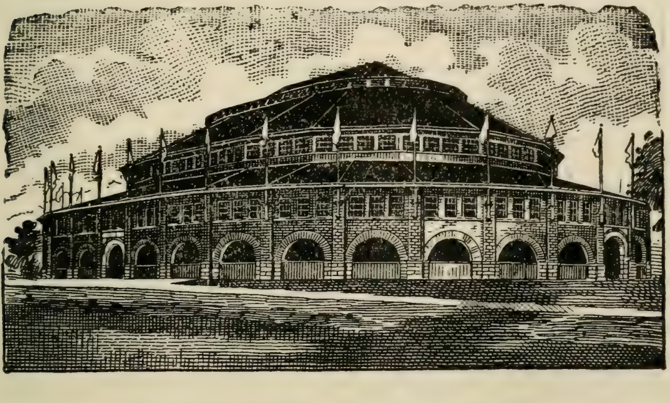
Wallaces' Farmer.

The Executive Council of Iowa last week completed the work of assessing the farm lands in the different counties of the State. As the value placed on the land in each county is a matter of considerable interest, not only to our readers but to many outside of the State who contemplate moving here, we reproduce the figures for each county herewith. The first column gives the final value per acre in 1901, the second the figures returned by the county assessors for 1903, and the third the revised figures as determined by the Executive Council acting as a State board of equalization:

REPORTED AND EQUALIZED VALUATION.

Counties.	Equalized value per acre, 1901.	Reported value per acre, 1903.	Equalized value per acre, 1903.
Adair	$28.84	$33.66	$37.02
Adams	31.26	40.49	42.51
Allamakee	21.40	22.52	23.42
Appanoose	25.34	29.96	32.04
Audubon	35.83	46.70	45.77
Benton	45.00	56.00	53.75
Black Hawk	43.20	48.50	49.95
Boone	38.00	46.67	48.06
Bremer	38.42	41.56	43.21
Buchanan	38.03	40.63	43.65
Buena Vista	36.51	46.21	45.75
Butler	38.00	48.05	46.51
Calhoun	32.58	50.30	46.78
Carroll	38.62	54.75	50.92
Cass	37.21	42.63	46.89
Cedar	49.33	52.65	52.60
Cerro Gordo	34.71	38.87	42.36
Cherokee	36.20	43.12	44.84
Chickasaw	32.06	37.27	39.59
Clarke	27.58	31.35	32.91
Clay	30.91	38.55	38.17
Clayton	28.62	33.15	32.82
Clinton	44.78	47.93	49.36
Crawford	33.87	39.84	43.02
Dallas	43.08	51.09	50.07
Davis	26.59	34.25	32.54
Decatur	27.95	34.00	32.30
Delaware	38.95	38.51	43.51
Des Moines	41.58	45.89	43.60
Dickinson	26.65	37.19	34.97
Dubuque	39.12	39.20	40.37
Emmet	28.44	34.55	39.93
Fayette	34.71	35.11	38.27
Floyd	37.41	43.94	43.51
Franklin	37.59	44.33	46.10
Fremont	38.29	40.46	42.48
Greene	37.95	48.26	47.30
Grundy	43.50	51.36	50.34
Guthrie	30.07	37.76	38.89
Hamilton	37.15	50.57	47.03
Hancock	25.24	31.97	34.84
Hardin	41.95	49.03	48.05
Harrison	28.91	28.09	37.33
Henry	40.38	44.57	42.35
Howard	33.22	41.57	42.35
Humboldt	32.19	40.05	40.05
Ida	35.95	37.56	40.56
Iowa	35.45	37.56	40.56
Jackson	29.43	30.66	33.06
Jasper	43.82	51.83	48.21
Jefferson	$35.15	$39.86	$39.86
Johnson	45.76	50.95	49.93
Jones	43.40	44.78	45.62
Keokuk	41.20	44.78	42.55
Kossuth	26.92	32.07	34.95
Lee	35.94	36.58	36.58
Linn	46.82	52.50	57.86
Louisa	36.22	40.56	40.56
Lucas	30.38	33.54	33.54
Lyon	31.36	39.79	39.40
Madison	29.82	37.00	38.81
Mahaska	44.28	46.19	43.89
Marion	35.95	39.69	39.00
Marshall	42.40	51.17	50.15
Mills	42.89	47.93	45.58
Mitchell	34.46	36.49	39.77
Monona	24.25	30.36	29.76
Monroe	29.13	33.23	33.23
Montgomery	43.57	52.17	46.96
Muscatine	46.64	51.30	50.28
O'Brien	34.61	38.79	42.28
Osceola	23.96	39.70	34.62
Page	42.97	50.36	47.85
Palo Alto	23.00	30.37	34.62
Plymouth	33.60	38.61	40.15
Pocahontas	32.87	44.47	44.03
Polk	53.00	62.30	57.94
Pottawattamie	43.45	53.22	47.90
Poweshiek	37.89	45.40	45.40
Ringgold	30.01	38.68	34.81
Sac	38.35	45.54	47.36
Scott	59.01	62.08	59.60
Shelby	34.18	38.17	41.22
Sioux	36.97	42.14	43.82
Story	40.60	50.71	49.71
Tama	42.06	49.52	48.60
Taylor	32.78	36.94	40.53
Union	33.24	39.41	37.44
Van Buren	31.00	31.70	33.28
Wapello	32.00	31.60	33.18
Warren	37.61	44.00	41.80
Washington	42.89	46.71	44.28
Wayne	27.00	38.00	34.20
Webster	35.33	45.19	44.29
Winnebago	28.57	38.44	34.22
Winneshiek	3[illegible].03	36.02	37.46
Woodbury	30.83	35.73	35.88
Worth	29.77	33.00	36.97
Wright	30.98	37.20	39.43

The reported actual value of lands this year was $1,455,524.027, and the adjusted actual value is $1.457,548.730. From this it appears, as given above, that the council added to the aggregate of the farm land assessment the sum of $2.024.700. The net increase in the actual adjusted value of lands over 1902 was $207.624.900. One fourth of this, or $51,906,243, is the increase in the taxable value of farm lands in Iowa this year.



Live Stock Pavilion, State Fair Grounds.

FARM ANIMALS AND VALUES.

Breeders' Gazette.

In line with the totals presented last week by the statistical division of the United States Department of Agriculture Mr. Hyde has now issued by states and territories the totals of cattle, sheep and swine in the country on January 1, 1903, together with the average and total value of each. The comprehensive table which follows sets forth the figures in detail.

ANIAMLS AND VALUES BY STATES AND TERRITORIES.

States and Territories.	Milch Cows.			Other Cattle.			Sheep.			Swine.		
	Number.	Average price per head.	Value.	Number.	Average price per head.	Value.	Number.	Average price per head.	Value.	Number.	Average price per head.	Value.
Maine	183,581	$31.59	$ 5,799,324	123,677	$17.46	$ 2,158,855	397,446	$ 2.92	$ 1,158,793	66,015	$11.00	$ 726,165
New Hampshire	123,667	32.50	4,019,178	101,198	18.21	1,842,674	89,788	2.78	249,647	60,225	11.42	573,570
Vermont	282,546	28.18	7,962,146	225,893	13.34	3,012,775	273,876	3.12	853,700	88,624	10.11	895,989
Massachussetts	181,481	39.00	7,077,759	93,400	16.34	1,526,566	48,231	4.57	220,537	69,127	13.68	945,657
Rhode Island	24,493	38.30	938,273	10,875	17.53	190,647	10,393	3.89	40,429	12,452	11.85	147,556
Connecicut	128,284	39.25	5,035,147	88,377	20.33	1,796,388	34,6[illegible]0	4.69	162,191	46,041	14.64	674,040
New York	1,576,503	35.28	55,6[illegible]9,026	925,408	16.24	15,512,188	1,397,845	3.73	5,219,273	631,866	10.87	6,868,601
New Jersey	172,347	39.69	6,840,452	82,890	19.82	1,643,149	47,037	4.24	199,597	157,213	11.77	1,850,397
Pennsylvania	1,044,625	31.54	32,947,472	823,143	16.56	13,630,431	1,133,437	3.40	3,85[illegible],625	970,953	10.13	9,835,754
Delaware	34,435	32.86	1,131,534	21,606	19.80	427,850	12,067	3.82	46,150	46,543	10.99	511,508
Maryland	145,992	29.61	4,322,823	133,992	18.56	2,486,244	166,902	3.58	597,342	290,353	8.63	2,505,746
Virginia	257,859	25.33	6,531,568	449,679	17.44	7,842,844	596,160	2.89	1,725,465	752,047	5.69	4,279,147
North Carolina	201,460	19.81	3,990,923	307,772	9.84	3,029,152	220,682	1.79	395,749	1,017,154	5.39	5,482,460
South Carolina	109,715	22.92	2,514,668	171,459	9.76	1,673,542	61,291	2.02	123,752	614,972	5.88	3,616,035
Georgia	274,604	21.94	6,024,812	623,033	9.32	5,806,173	297,484	1.80	586,186	1,425,285	5.23	7,454,241
Florida	82,047	21.60	1,772,215	544,298	8.62	4,691,361	99,067	1.98	196,253	395,528	3.00	1,186,584
Alabama	234,792	18.62	4,371,827	399,319	7.45	2,975,843	212,797	1.55	330,558	1,114,083	4.58	5,102,500
Mississippi	264,030	19.43	5,130,103	436,219	9.02	3,935,174	199,456	1.60	319,290	1,078,291	5.12	5,520,850
Louisiana	164,706	24.81	4,086,356	421,818	10.99	4,635,570	178,439	1.83	326,026	676,429	4.93	3,334,795
Texas	813,852	22.26	18,116,346	907,910	13.70	109,698,754	1,736,603	2.04	3,541,803	2,312,315	4.40	10,174,186
Arkansas	272,629	19.93	5,432,496	455,305	9.05	4,122,422	177,414	1.62	287,039	1,013,409	4.52	5,580,609
Tennessee	282,557	22.97	6,490,334	442,405	12.47	5,514,798	326,498	2.19	714,313	1,043,231	5.66	5,904,687
West Virginia	178,628	28.44	5,080,180	359,593	20.19	7,259,350	705,382	2.73	1,926,115	300,686	7.42	2,231,090
Kentucky	298,570	26.69	7,968,853	508,918	19.07	9,706,192	790,966	2.62	2,072,7[illegible]6	998,531	5.99	5,980,602
Ohio	767,516	33.46	25,681,085	1,190,024	22.24	26,467,081	3,447,786	3.12	10,743,991	2,756,096	8.75	24,115,840
Michigan	534,605	34.52	18,454,565	736,441	17.99	13,246,509	2,465,221	3.25	8,014,680	999,183	8.76	8,752,843
Indiana	558,702	32.11	17,939,921	913,860	22.81	20,844,059	1,355,436	3.44	4,667,308	2,712,297	8.24	23,349,327
Illinois	985,769	35.32	34,817,361	1,700,716	26.49	45,054,861	988,174	3.84	3,792,969	3,747,495	9.43	35,338,878
Wisconsin	1,032,955	31.01	32,031,935	1,148,698	15.54	17,845,142	1,473,197	3.04	4,476,457	1,686,885	8.98	15,148,227
Minnesota	788,884	25.45	22,443,750	1,002,668	13.35	13,388,324	564,107	2.93	1,650,408	1,244,663	9.35	11,637,599
Iowa	1,390,912	30.03	41,769,087	3,574,012	23.10	82,544,665	898,040	3.58	3,211,571	7,438,655	8.97	66,724,735
Missouri	575,658	28.35	16,319,904	1,405,081	21.54	30,263,330	810,543	2.99	2,420,200	3,050,487	7.33	22,360,070
Kansas	706,309	28.35	20,023,860	2,741,236	22.53	61,747,445	271,360	3.00	813,891	1,875,692	8.52	15,980,896
Nebraska	618,894	28.33	17,533,267	2,403,999	19.71	47,384,737	536,939	2.76	1,481,950	2,889,133	8.73	25,222,131
South Dakota	178,679	23.10	10,640,880	1,456,291	20.49	29,386,195	918,065	2.86	2,621,718	804,329	9.62	7,737,645

North Dakota	166,665	32.87	5,478,279	570,956	22.40	12,788,267	827,781	2.98	2,462,969	175,403	10.17	1,783,849
Montana	52,380	40.12	2,101,486	1,048,559	27.24	28,560,233	8,932,311	2.48	22,137,839	51,745	10.84	560,916
Wyoming	19,587	38.46	753,316	796,060	23.31	18,553,928	5,826,150	2.46	14,306,695	15,983	10.56	168,780
Colorado	120,569	33.24	4,007,714	1,286,300	19.04	24,491,409	2,337,365	2.21	5,156,461	75,133	8.49	637,879
New Mexico	18,657	34.84	650,010	872,471	17.45	15,220,959	5,677,156	1.72	9,754,490	21,383	6.93	148,184
Arizona	18,486	37.58	694,704	551,328	16.56	9,129,446	1,099,180	2.54	2,794,334	16,112	7.53	121,323
Utah	68,808	32.82	2,258,279	254,326	19.65	4,997,689	3,570,070	2.40	8,561,386	58,575	9.15	535,961
Nevada	16,010	37.33	597,653	364,165	22.35	8,138,873	1,034,826	2.89	2,991,166	14,158	7.00	99,106
Idaho	54,082	35.42	1,915,584	362,089	21.81	7,898,899	4,541,815	2.56	11,612,513	119,611	7.54	901,867
Washington	141,701	38.55	5,462,574	309,909	22.24	6,893,804	1,146,583	2.90	3,330,708	181,326	8.30	1,505,006
Oregon	129,713	35.63	4,621,674	570,044	20.61	11,750,484	3,569,754	2.54	9,052,183	271,704	6.79	1,844,870
California	337,482	40.43	13,644,397	1,111,767	24.51	27,244,079	2,365,884	2.92	6,915,716	511,311	7.63	3,901,303
Oklahoma	183,122	26.76	4,900,345	1,312,620	19.01	24,947,783	67,623	2.63	177,923	472,528	7.50	3,543,960
Indian Territory	105,674	26.17	2,765,429	1,187,399	16.59	19,697,759	26,349	2.76	72,715	561,444	6.18	3,469,724
United States	17,105,227	$30.21	$516,711,914	44,659,206	$18.45	$824,054,902	63,964,876	$ 2.63	$168,315,750	46,922,624	$ 7.78	$364,973,688

From the foregoing it will be observed that only four States have more than one million milch cows. These in order are New York, Iowa, Pennsylvania and Wisconsin. It has generally been considered that the farther east one travels in this country the higher the value of stock becomes but it will be seen that such is not the case with milch cows, for California has an average value of $40.43 and Montana of $40.12, whereas none of the Atlantic States reaches so high. In the possession of cattle other than milkers Texas of course leads the procession, with Iowa again second, though this time much farther behind. Montana, which has fewer cattle to its credit than has been generally supposed, has the highest valuation in this lot, the figures being $27.24. Montana is the only State which calls its cattle other than milch cows worth $27 or more.

In the possession of sheep Montana is easily in the lead, its 8,932,311 placing it away ahead of Wyoming and New Mexico, which are second and third with over 5,000,000 head. Connecticut this time leads in value, its sheep being worth on the average $4.69. In the hog division it is Iowa first and the rest nowhere, its 4,438,655 head placing it in a class by itself. Illinois is second with just about half that number, and the surprise of the swine column is furnished by Texas, which this year shows more than two and one quarter millions of hogs, which is a large number for the Lone Star State, even if they are worth only $4.40 each. Connecticut again leads in value, its swine being worth on the average $14.64 per head.

As previously stated, it should be remembered when comparing these figures with those of the government census of June 1, 1900, that these now presented are brought up to January 1st and naturally include the calf, lamb and pig crops of last year, while figures compiled in the beginning of summer can not be rounded out in the same way. It is stated that the figures just published by the Department of Agriculture are the most complete it has ever offered.

CHICAGO'S LIVE STOCK TRADE.

Breeders' Gazette.

Greatest in point of the number of animals received in the Union Stock Yards, Chicago stands the year 1903 just past. The value of these animals does not stand as high by a few thousand dollars as the value for 1902, but the difference is very small when it is considered that almost every variety of live stock closed the year much lower in price than when the year opened. The grand total of all animals received in these yards during 1903 was 15,713,515 against 15,706,360 for 1902. The total shipments for 1903 were 3,628,130, and for 1902 the figures were 3,116,643. The total valuation of these millions of cattle, sheep, swine and horses was $288,152,707, to which there must be added the sum of $7,900,000 representing the value of swine slaughtered by packers doing business in Chicago but outside the yard's territory. This forms a total of upwards of $296,000.000 to be compared with $312,884,386 for 1902.

Cattle came to the number of 3,432,486 as against 2,935,495 in 1903. Swine numbering 7,325,923 were received as compared with 7,891,728 last year, sheep 4.582,760 against 4,515,072, horses 100,603 against 101,555, total cars 302,915 against 278,100.

Average weight of all the cattle received for the year is 1,038 pounds as compared with 982 for 1902. for hogs 226 as compared with 220 and for sheep 82 as compared with 84 pounds. The average price declined $1.35 for beef steers averaging from 1,200 to 1,500 pounds, and for swine around 85 cents per hundred-weight, but the values of native sheep and native and Western lambs averaged a dime higher, though Western sheep show to be 25 cents lower than they were in 1902. It was not the banner year for cattle, swine or horses, but it was for calves and sheep. It was the banner year for shipmentst of cattle and sheep. One more railroad has been led into the yards during the year, that one being the Pere Marquette, which has only lately been able to establish terminal quarters in Chicago.

Monthly average prices were highest in August for cattle, when the figures were $5. and lowest in November, at $4.45. Hogs were highest in March, at $7.30. and lowest in December, at $4.45. Sheep averaged highest in March, at $5.40, and lowest in November, at $3.05, while lambs were highest in March, at $6.60, and lowest in November, at $4.70. Taking the year altogether the average price for decent native steers is $4.80, for cows and heifers $3.95 and for Texas steers $3.95, for hogs, $6, sheep $4.05 and for lambs $5.45. Last year the averages were: for native beef steers $6.20, cows and heifers $4.70, Texas steers $4.80, hogs $6.85, sheep $4.20 and for lambs $5.50, so that it will be seen the losses on cattle and swine are large, while sheep and lambs have about maintained their price-level.

Largest receipts per day in the Chicago market are thus listed: cattle, September 28, 1903, 44,445; calves, April 15, 1902, 5,076; swine, February 11, 1895, 74.551; sheep, September 29, 1902, 59,362; horses, March 21. 1901, 1,697; cars, December 1, 1902, 2,811. It will thus be seen that though this has been a season of gigantic arrivals other years still hold the most of the records. Calves only broke the weekly and monthly and calves and sheep only the yearly records.

Despite the great reduction of values there are yet some very hopeful signs, which are admirably set forth by President J. H. Spoor of the Union Stock Yard & Transit Co. in a letter to the Chicago *Record-Herald*, published on the first day of the year and reviewing the conditions general in the agricultural West. It runs as follows:

"In the great live stock industry of the United States and in general agriculture vast changes are taking place. The public is beginning to realize that the preservation of soil fertility, both West and South as well as the East, requires the raising of live stock on farms and a careful utilizing of manure, together with improved methods in the rotation and cultivation of crops, and that soil fertility must be preserved as the foundation of agricultural and national prosperity.

"The marked success of agricultural colleges in improving farm products and winning live stock premiums at State, national and international expositions has attracted attention everywhere to their practical and successful methods. The agricultural population of this country is doing more reading and thinking toward improved production than was ever known in rural history, and the United States government, through its Department of Agriculture, Commerce and free rural mail delivery, is doing everything possible to encourage such progress.

"A closer study of feeds and feeding on the part of farmers and feeders generally in this country has led to greater economy and more variety in the use of feedstuffs, with consequent better health of our domestic animals than ever before, while the eye of nearly every farmer and stock raiser is being trained to discriminate between the coarse, ill-proportioned and poorly growing 'scrub' and the fine, well-proportioned, thrifty and well-bred animal of quick maturity.

"The public preference for meats, both at home and abroad, is rapidly changing from heavy, fat animals of mature age to plump, well-bred 'baby beef,' 'baby mutton' and young pork, and growers of meat animals must realize thaet if they would reap the greatest benefit from their industry they must get in line with public demand. Moreover, it is a well-known fact that the greatest gain from a given amount of feed is to be obtained from growing animals and not from fattening animals that have already reached the age of maturity.

"The study of soils, the better breeding of plants and animals, the study of balanced rations for animals and men, the use of manure spreaders, corn harvesters and other new inventions, better buildings, more shelter for stock and improved roads, the spread of cheap interurban transportation, the telephone, daily mail delivery, with market information, farming and stock journals, books and magazines, agricultural colleges, experiment stations and agriculture in the public schools for education of the young, local, State and national live stock and agricultural associations, for discussion, organized action and better education of farmers and stockmen in their business of supplying the country's needs; local, State and national fairs and expositions of live stock and agriculture for demonstration of progress made, for offering inducements through competition and rewards towards higher excellence, and for practical education of the eye and mind in all that pertains to excellence in the form and quality of exhibits—these are some of the causes and incentives that are leading to more mental activity, more material prosperity, more home comforts and more social life on the farm, and these changes are destined eventually to turn the mighty tide of population away from the cities back to the country, thereby contributing immeasurably to the welfare and happiness of the whole nation.

"All these changes are significant. They point inevitably to a future surplus of superior meats and draft animals that, together with wise measures of reciprocity established by our government with foreign nations, will enable us to go abroad and market our more excellent surplus in successful competition with other producing nations, with mutual benefits to our patrons and ourselves.

"This country, with its wonderful natural resources, its marvelous army of labor-saving agricultural machinery, the intelligence, freedom, thrift and enterprise of its agricultural population, and its splendid systems of transportation, needs only to study the demands of consumers at home and abroad and direct those elements to the production and distribution of the best in abundance, in order to prosper as no nation has ever done. This applies with especial emphasis to meat and draft animals and meat products of all kinds. To those who study methods of the highest economy and efficiency and strive to reach the highest degree of excellence in live stock production will belong the greatest rewards, not only in direct pecuniary profits, but also in the growing fertility of their lands. Those sections of the nation where this policy has been most persistently and consistently followed are today inhabited by the most wealthy, prosperous and intelligent people on earth, who wield the most powerful public influence."

THE OUTLOOK CUT NO FIGURE.

Exchange.

A farmer was hoeing hard on his patch of land when one of the town loafers approached the fence.

"Hullo, Farmer B, what do you think of the outlook?"

"What outlook? Didn't know there was one."

"We're all talking about it down at the store and they sent me up to hear what you had to say."

"Oh, yes; I see. Well, you tell 'em if they will stop talking to go to hoeing that the country will prosper without any outlook. Do you hear me?"

RULES FOR MEASURING HAY.

It is generally reckoned that a ton of newly stored hay measures five hundred cubic feet, which is practically a cube eight feet long, eight feet wide and eight feet deep. Hay that has been allowed to settle for some time is usually measured by allowing four hundred and twenty-two feet to the ton, or a cube seven and one half feet wide and seven and one half feet deep. After it has become thoroughly settled three hundred and forty-three feet will make a ton, or a cube having sides of seven feet.

It must be remembered that the figures given above are only approximate and that after all a good deal must be left to the judgment concerning the compactness of the hay. Sometimes fuzzy clover does not settle very compactly, even though it has been stored for some time, in which case some allowance would have to be made in the measuring.

MARKETING LIVE STOCK.

Farmers' Bulletin No. 184, U. S. Department of Agriculture.

STOCK YARDS.

Organization and location. Stock yards in different cities are organized on the same general lines. The ownership and control is vested in an incorporated company, in many cases the name Union Stock Yards Company being adopted. This company usually owns the land ethe yards cover, or control its use. Frequently the shares of stock in such yards are owned more or less largely by the railway companies that have tracks in or alongside these yards. The yards are usually located in the suburbs of the cities, owing to the considerable space they occupy. Those of Chicago are about four miles southwest of the heart of the business section; those of Omaha are in the southern suburbs; those of Buffalo some miles east of the city; and those of Boston at Brighton. five miles west from the city. The yards are located so as to be easily penetrated by the various railways engaged in live stock transportation.

Arrangement of stock yards. The space devoted to yards is divided into sections and blocks, after the manner of laying out a town site. There are main drives and alleys. with the space between filled with stock houses and pens. A live stock exchange usually occupies a prominent and convenient situation in the yards. Packing houses and other buildings associated with the trade may also be located in the yards. or on land adjoining. Each class of stock is usually grouped in buildings or pens more or less restricted to its kind. The horse barns are always separate and not in the main inclosure. Cattle. sheep and hogs may be under the same roof, yet in different sections and pens.

The pens used for handling stock are supplied with feed boxes and running water. Lines of railway switch alongside or into the yards. and one or more cars, or an entire trainload. may be quickly unloaded on a receiving platform alongside the pens.

LIVE STOCK EXCHANGES.

The methods employed in the yards in different cities will necessarily differ somewhat, yet. excepting in minor matters, the customs are much the same. The rules and regulations are provided by the live stock exchange. which is a branch of the National Live Stock Exchange. A local live stock exchange is really an organization of dealers in the yards who buy and sell a large part of the stock shipped in. In the exchange building are its headquarters, and here are the various offices of the live stock commission men. The exchange has a board of officers. consisting of a president. vice president, secretary. treasurer and board of directors. There are also committees in charge of certain work of the exchange. The purpose of this exchange. as set forth in the charter of the Chicago Live Stock Exchange, is "to establish and maintain a commercial exchange; to promote uniformity in the customs and usages of merchants; to provide for the speedy adjustment of all business disputes between its members; to facilitate the receiving and distributing of live stock as well as to provide for and maintain a rigid inspection thereof, thereby guarding against the sale or use of unsound or unhealthy meats; and generally to secure to its members the benefits of co-operation in the furtherance of their legitimate pursuits."

All persons selling or buying stock in the yards must conform to the rules made by the exchange or by the stock yards company, paying such rates for yardage, feed or commission as it or they may establish.

RULES OF STOCK YARDS.

Those rules which especially interest shippers relate to the use of the yards, the commission on animals bought or sold, cost of feed, switching expenses, and disposal of sick, injured or dead animals.

Water is furnished free to all stock in all yards, but the cost for feed varies. The stock yards company furnishes hay and grain at different points in the yard. A person having charge of a consignment of stock in pen goes to the office of a feed superintendent and fills out a blank form for whatever feed is desired, receiving a duplicate copy of his order. This feed is then delivered to the pens as requested. The charge for feed varies in the different yards of the country. The Omaha yards, for example, charge $1 per hundred for hay and $1 per bushel each for corn and oats. In Pittsburg the charges are $1.25 per bushel for corn and $1.50 per hundred for hay; in Buffalo they are the same.

In view of the fact that commission charges are important, those adopted by the Chicago Live Stock Exchange on February 5, 1901, are given, as showing something of the character of the charges made to shippers:

Section 1. The commission for selling live stock shall not be less than the following named rates:

Section 2. Fifty cents per head for all cattle of all ages, up to $12 per carload; provided that veal calves in less than car lots shall be charged not less than 25 cents per head; double-deck cars of calves, $18.

Section 3. Six dollars per carload for single-deck cars of hogs or sheep, or hogs and sheep, and $10 per carload for double-deck cars of the same. When part of a car is double-decked and loaded with hogs or sheep, or both, the commission for selling such fractional upper-deck shall be 15 cents per head up to $10 per carload.

Section 4. Forty head or more of hogs or sheep, or hogs and sheep, arriving at these yards in a single-deck car, shall not be considered as a mixed car but shall constitute one carload to be charged $6. For stock arriving at these yards in less than carload lots, 50 cents per head for cattle, 25 cents per head for calves, and 15 per head for hogs or sheep, under forty head.

Section 5. The charges for different species of live stock in a single car are as follows:

Cattle per head, up to $12 per carload, 50 cents.

Calves per head, up to $12 per carload (single-deck), 25 cents.

Hogs per head, up to $6 per carload (single-deck), 15 cents.

Sheep per head, up to $6 per carload (single-deck), 15 cents.

The commission on mixed live stock shall be governed by this section up to a charge of $12 per single-deck carload, and $18 per double-deck carload.

When part of a car is double-decked and loaded with hogs, sheep or calves, the commission for selling such fractional upper-deck shall be at the rates herein established for selling single-deckers of mixed stock.

Section 6. The commission for purchasing live stock shall not be less than the following named rates:

Stocker and feeder cattle (including calves), per head (but not to exceed $10 per carload, unless the parties, in connection with a loan or advancement, agree to pay per head, without regard to the number constituting a carload lot)	$ 0.50
Stock and feeding sheep and lambs, per single-deck carload	6.00
Stock and feeding sheep and lambs, per double-deck carload	10.00

Severe fines are provided for a violation of the above rules on the Chicago Live Stock Exchange.

Stock yard companies care for the stock from the time of its arrival until it is disposed of. This usually includes handling, watering, feeding and weighing. No charge is made for the use of the yards. There is one charge for weighing, usually termed "yardage," which is collected when the stock is sold.

The yardage charges in Buffalo and Pittsburg are 15 cents per head for cattle, 6 cents for hogs, 4 for sheep and 8 for calves. The Omaha charges are 25 cents for cattle, 8 cents for hogs, 5 cents for sheep and 10 cents for calves. In Chicago there is a terminal charge of $2 each on cars coming in over western roads, and $1 on those coming in over eastern roads. The terminal charges, yardage and fee charges constitute the main source of revenue of the stock yards company.

SELLING STOCK IN YARDS.

Unloading the stock. The stock is driven from the car onto the receiving platform, and from this it is driven by chutes to the pens in various parts of the yards. One may unload a carload of stock, drive it into an alley adjoining the platform, and thence to any part of the yard desired. Cross gates are at frequent intervals, which will permit one to direct his stock at his pleasure with but little trouble. After the stock is placed in pens it is available for sale. The shipper usually turns it over to a commission firm to sell, although this is not a necessity. Yet one not regularly on the market can not sell to as good advantage as can the regular dealers. This is because irregular sellers are not in touch with the buyers, so as to secure a wide range of custom.

The animals received in stock yards usually reach the market very early in the morning, and by noon the active business of the day is about completed.

Buyers and sellers. There are two classes of men in the yards about the pens, the commission men selling and the buyers. The first thing each morning these men inform themselves regarding the quotations on the various classes and grades of stock and the visible supply. If the supply is short and the demand for certain grades is active, then the buyers seek the salesmen; but if the market is dull and indifferent then the sellers seek the buyers. Where men buy for the packing houses, they receive a daily statement of the slaughter record of the animals purchased by them the day previous.

The buyer looks over a consignment of stock in the pens after a price has been made by a salesman. He may accept at the price offered or there may be some sparring over the price, and finally a sale may be made by a nod of head or a wave of hand.

Weighing in the yards. This takes place at various points, and the larger the yards the greater the number of scales. These stock scales, each in charge of a weighmaster, have large platforms capable of holding fifty or sixty mature cattle, and have a weighing capacity up to 100,000 pounds.

The animals are driven from the pen to the scales soon after the sale. The weighmaster, who is an employe of the yards, does the weighing, and a representative of the commission firm also takes a reading from the beam. A scale ticket is then made out which gives the number of animals and the weight, and the names of the buyer and commission firm making the sale. Four copies of the scale record of each draft of animals are made by the weighmaster at one writing by a duplicating process. One record is made in his peramnent record book; another consisting of a detachable copy for the use of buyers' helpers at the scales, which is placed on file for inspection, while third and fourth copies are issued, respectively, to buyer and seller. One of the latter serves as a certificate to adjust the buyer's accounts and the other the seller's.

All animals should be counted on leaving the scales, and, if not taken in charge at once by the buyer or his representative, are placed in pens and locked in. Authorized commission men are usually at the scales to look after the weighed stock. After weighing, the stock may be delivered to any point desired, as, for example, to a packing house, or to a stock car, or they may be driven out of the yards.

Methods of settlement. Banking facilities are found in all prominent stock yards in one or more organized banks of well established credit. In view of the fact that the business of the yards is transacted on a cash basis, a bank is very helpful to the great business interests of the yards.

Methods of settlement in stock yards may differ in minor details in different cities, but in general they are much the same. After the stock is weighed, the weighmaster's certificates, showing the number and weight of the animals sold in each case, are delivered to the seller, whether the owner of the stock in person or his commission agent. If to the latter, a bill is sent to the purchaser, comprising a duplicate of the scale record, with the selling price of the stock, and the amount of the bill. The buyer of the stock indorses the bill and returns the duplicate to the commission agent with an order—perhaps on the back of the bill or may be by check—on a bank to pay the commission firm this sum of money. With the payment of the order or check it returns to the buyer as an accepted check, serving as a complete receipt and voucher, showing the entire course of the transaction. This includes an exact duplicate of the weighmaster's certificate, the commission man's indorsement, and the bank's stamp, giving date of the settlement.

It is customary for the commission agent, even before settling with the buyer, to send to the shipper, if nonresident and not otherwise represented, a statement of the gross proceeds of the sale, with deductions for freight, commission, yardage, etc., and to forward him the balance due. The payment is of course usually made by means of a bank draft or check, according to local conditions. Such negotiable paper is equivalent to cash.

INSPECTION OF STOCK.

Government supervision. The Bureau of Animal Industry of the United States Department of Agriculture, by authority of Congress, takes charge of the enforcement of all national laws relative to diseased live stock and its control. The Secretary of Agriculture is empowered to issue from time to time regulations for live stock inspection, quarantine and slaughter. Live stock commissioners or State veterinarians and boards of health supervising State live stock interests are also expected to co-operate with the Bureau of Animal Industry.

In 1903 cattle, sheep, calves and hogs and their products were inspected at 156 abattoirs and packing houses, located in fifty cities of the United States. Inspections were also made of the live stock and meat contents of vessels engaged in the export or import trade.

In those markets subject to Government supervision a trained veterinarian has charge of the inspection, and associated with him is one or more inspectors, as the case may be, the number depending on the size of the market. Not only do United States inspectors officiate, but in some cities, like Chicago, representatives of both city and State also inspect. City inspectors are used only for the inspection of meat to be consumed in the city where the yards and abattoir are located. The inspectors of the State board of live stock commissioners (or similar office with some other name) are mainly interested in seeing that no animals suffering from disease shall enter the market and be allowed to contaminate the healthy stock of the State. The United States inspector deals with the subject in its broadest sense, as affecting interstate and international trade. The live stock exchange at the yards, including as it does the commission men, co-operates with the Government to promote as high a standard of health in herds and flocks as it is possible to obtain. Every person who does business in the yards is under strict obligation to obey all the rules and regulations issued by local, State and national governments.

Cattle originating in the section of country infested by the ticks of the species which causes Texas, or splenetic, fever, may be shipped out of that quarantine district only in accordance with the regulations of the Department of Agriculture; and, except for a short period during the winter, they may be shipped only for immediate slaughter.

Importance of inspection. The importance of a strict enforcement of these laws can hardly be overestimated. The export trade in live stock and dressed meats amounts to many million dollars per year. Foreign governments will prohibit the entrance of American meats into their markets if it is found that they are diseased. In 1881 Germany, France and other European countries prohibited the entrance of our pork into their markets, claiming that it was affected with trichinæ. We sold to France and Germany alone 113,000,000 pounds of pork in 1880. Later Great Britain refused admission to our cattle and sheep on the ground that they were diseased. This resulted in the adoption by the United States Government of rigid measures to protect our live stock interests by aggressively combatting all known cases of contagious disease, and finally adopting systematic inspection at the leading centers of live stock shipment and consumption. This inspection increased from twelve cities and twenty-eight abattoirs in 1892, to fifty-two cities and 157 abattoirs in 1901. Today no government in the world exercises more careful supervision of the healthfulness of its meat supply than does the United States of America. Not only have the inspectors done their work in this country, but trained American veterinarians are stationed abroad to take observations on the condition of American live stock and meats as received in the great ports of Europe.

Inspection in the yards. Soon after the receipt of animals in the yards they are inspected by a veterinarian. Animals suffering from a disease or injury which makes them unfit for food are condemned to the rendering works. The same applies to animals which arrived at the yards dead, as occurs daily with hogs and sheep, and occasionally with cattle. Animals in poor condition and under suspicion as unfit for food are marked with metal tags in the ears, and are placed in special pens for further observation or slaughter. These animals are slaughtered under the supervision of attendant veterinarians, and records are made of each case. In cases of animals which are out of form in some respect, yet not unfit for food, the meat is sold to local buyers. In the yard inspection it may happen that some animals fall under suspicion that will later be allowed to go with the passed animals as being salable on open market.

Cows within a month of parturition, and for ten days after, will be subject to condemnation. In the slaughterhouses the meat of all cows that have calves inside with the hair on is condemned. So also are all pregnant cows near parturition, hogs with bunches, boils, cuts on hams and shoulders, etc. "Bob," or "deacon" calves are condemned, and also sheep emaciated and in bad condition.

The live stock exchange holds itself responsible for the disposal of condemned animals, and after deducting cost of the service, pays to the owner of the condemned animal whatever balance may come to his credit. No animal is a complete loss, as the fertilizer and soap factories can use the lowest grade of flesh.

Such animals as pass the inspectors must also be inspected during the operation of killing and dressing. Several inspectors are found in each of the largest packing houses, and they are constantly discovering cases that escaped detection on foot, which show by diseased internal organs that they should not be used for food. Hogs suffering from cholera are a good example of this. In 1903 in postmortem inspection United States inspectors condemned 19.256 carcasses of hogs found to be suffering from cholera, while 8.598 cattle carcasses were condemned as being tuberculous. Every condemned carcass in the slaughterhouse is at once tagged with a special tag, showing it to be condemned. This may be subjected to further scientific examination or may at once be ordered to the rendering tanks.

Microscopal examination. For some years the Bureau of Animal Industry has conducted extended microscopal examination of pork in many stock yards. Three pieces of flesh from different parts of the muscle of the hog are placed in numbered labeled tin boxes, the numbers corresponding with the number of the carcass inspected. Then each sample is crushed flat between two glass plates and placed under the microscope. In 1903 there were examined in the United States by the Bureau of Animal Industry 489,667 carcasses of hogs. The results of this examination may be expressed as follows:

	Carcasses.
Class A. Free from all appearances of trichinæ	477,195
Class B. Containing trichina-like bodies or disintegrating trichinæ	7,394
Class C. Containing living trichinæ	5,078

In 1903 there were 5,136 trichinous carcasses disposed of, weighing in excess of 1,000,000 pounds. Government certificates are attached to all the pork for export, showing it to be healthy.

All animals are inspected, including horses, since glanders and other contagious diseases are frequently discovered. In such yards as those at Chicago an inspector stands at each gate to pass on every animal going through. Even if an anmal in unfit condition passes free of suspicion at first entrance, the chances are that subsequent inspections will result in its discovery. In the western stock yards "brand inspectors" are employed to inspect for stray branded cattle that have been lost or stolen from the range. Such animals may be sold and the money turned over to the owner whose brand in each instance is known.

Docking. Docking is more or less practiced in all live stock buying for animals of certain kinds, and especially so in the more exacting city trade. All pregnant sows and also sows that have once had pigs but are not pregnant at sale are docked. Stags are also docked. For example, in the Indianapolis yard pregnant sows are docked forty pounds and stags eighty pounds. In a small local yard the writer has had old breeding sows not pregnant docked thirty pounds. In some localities old sows are docked 50 to 75 cents per hundred and stags $1.

THE ABATTOIR AND PACKING HOUSE.

While the slaughter of animals and the disposal of the meat are not involved in the marketing of live stock, they are closely connected therewith, and will, therefore, be given brief consideration here.

Abattoirs or slaughterhouses vary in their equipment and capacity for work from the small local one to that of the great packing houses of the large cities. In the one case only a few animals are killed to supply a local consumption; in the other, thousands of animals are killed daily and their parts are distributed among the markets of the world.

In this country men in small towns usually either buy their meat at wholesale from the agent of some nonresident packing house, or they slaughter in a small way in some sort of a barn-like structure on the outskirts of the town. Small combined slaughter and packing houses occur in small cities. In some cases the firm owning the building will, for a certain consideration, permit other butchers to slaughter their stock at so much per head or for a regular annual rental. Such an establishment will have more paddocks than common for one butcher, and will also have greater floor space than would be necessary in a small city for one firm.

Cattle, sheep and swine in America are usually slaughtered by cutting the throat. Cattle are first stunned by a blow on the frontal bone of the skull from a long handled heavy hammer, which fells them, after which the throat is cut. Sheep are seized by the hind legs and are suspended to hooks, which are stuck through the legs above the ankle between bone and sinew, after which the throat is cut as the animal hangs. Hogs have the jugular vein cut by a quick movement of the knife.

The general plan after killing is to remove the skins of cattle and sheep or hair of swine as soon as possible after death, after which the internal organs are removed by making an opening from throat to vent, laying the entire body cavity open for removing the parts. In the great packing houses of today, and in some cases even in small, local slaughterhouses, everything is saved and sold for some special purpose.

PACKING HOUSE METHODS.

The largest packing houses in the world are situated in the Union Stock Yards at Chicago.

Methods with cattle. The cattle enter the slaughterhouse from the yards through a narrow chute leading into the "knock-out" pens, which consist of a long narrow room, wide enough to hold two cattle abreast. When two steers reach the end of the room, a wooden partition is let down behind them, and in front of the pair back of them, and in this way throughout. From four to ten pens are thus used. Men known as "knockers" or "stunners" stand on planks overhead and strike the animals deadly blows on the head, when they drop to the floor stunned. One side of the stall is then raised, the floor is tilted by means of a mechanical arrangement, and the animal rolls out onto a shackling floor. Here a man places a chain about the hind legs and hooks it onto a chain suspended from a traveling pulley. By machinery the animal is then hoisted until the head clears the floor and is carried along, suspended from an overhead track, until it reaches the "sticker." Here a man cuts the throat, doing about four hundred and twenty five an hour. Then begins a journey of dismemberment for the carcass, which passes through a line of men each with a specific work to do on the carcass or entrails, until the cooler is reached. So systematically is the work of dressing the carcass done that miscuts or injuries to any animals or part can at once be traced to the employe doing the damage. This is the case with all the animals slaughtered, no matter whether cattle, sheep or swine.

Methods with hogs. The hogs are driven into slaughter pens and run beneath hoisting wheels ten feet in diameter, operated by machinery. In the pen a shackler places a chain about the hind leg of a hog and hooks him to one of six chains hanging at equal distances apart from the rim of the hoisting wheel. The animal is hauled up by the slow revolution of the wheel and descends on the opposite side, when the chain about the leg catches on a "sticking bar," which liberates the hog from the wheel and slides him onto a rail, from which, by gravity, he gradually moves into the sticking pen. The hogs here come into the hands of a man who, with a knife, sticks about ten a minute. From the sticker they pass on to the scalding vat, into which they are dropped free of the shackles. The bristles on the hams, shoulders and back are removed by hand, after which the carcass is carried up through an automatic hog-scraping machine. After scraping, the body is beheaded, following which comes the cleaning of entrails, general dressing and placing in the cooler.

Methods with sheep. In the sheep pens boys fasten a chain to the hind legs of two sheep, which is attached to a triangular link and hooked into a hoisting chain, which is raised and lowered by electricity. The hoister transfers the sheep to a traveling pulley on a track slightly inclined downward, along which they move to the sticker, who cuts the throats of from five hundred to six hundred per hour. The sheep pass beyond the sticker to others, who take off the skin and head, remove the entrails, and do the other work necessary to placing the carcass in the cooler. In the sheep house they have what is called an operating ring, which is a line of racks on which the carcasses are hung while being dressed. Operators travel about the ring in regular order and complete the work of dressing, after which the carcasses are placed in the

All slaughtered animals are inspected during the process of killing and dressing by a representative of the Bureau of Animal Industry. They are also inspected and officially tagged in the cooler.

Cold storage. The large packing houses have immense cold storage plants, in which thousands of carcasses can be hung on overhead hooks. These cold rooms are arranged in sections, with varying degrees of temperature. The warm carcass is placed in a room only moderately cold, where it remains for some hours to chill, after which it is moved into a room having a lower temperature, and finally to one with a temperature of about 38 degrees Fahrenheit. One of the packing house companies of Chicago states in a circular letter that its coolers hold about 13,340 sides of beef, 17,000 hogs, and many thousand sheep.

Use of waste products. Strictly speaking, there is no waste in the up-to-date packing house. The following are some of the uses made of those parts of the animal that can not be regarded as dressed carcass Horns are converted into combs, buttons and handles, and are used for making fertilizer and glue. The better grades of hoofs are useful in making knife handles, buttons and fancy articles, the inferior grades going into fertilizers. The foot also yields neat's foot oil. The first flow of the blood is used in making albumen, a substance used for holding dyes, making paints and clarifying sugar. Blood not used in albumen manufacture is converted into high-grade fertilizer. Intestines are largely used as sausage casings; they are also used for shipments of lard, for containing putty and by gold beaters. The hides are trimmed, salted and packed and later sold to tanners. The bristles of hogs are used for brushes, the hair from cattle for mattresses and cushions and the wool from the sheep pelts finds its way into the woolen trade. Even the wash water before being emptied into the sewer is surface-skimmed for the removal of all grease, which is used in the soap factory. Last but not least, the fertilizer works, now connected with all large packing houses, consume a large amount of definite or indefinite material which is made into fertilizer or forms of animal foods.

Superiority of American methods. No phase of our great live stock interests has been reduced to such a systematic basis as the modern metropolitan packing house. The conditions are on a high plane of sanitation, cleanliness and health. European methods of killing and dressing stock are fifty years behind those of the United States, viewed from the standpoint of humanity, economy or system. One only needs to view the old-fashioned and often cruel work in the slaughter pens across the river from Liverpool, England, and in the La Villete yards of Paris, to see a great difference in favor of the methods employed in this country.

Visitors to the Union Stock Yards at Chicago will do well to visit one of the great packing houses in that place, and examine the methods employed. There are six great establishments there, and they make visitors welcome and furnish them free guides. Some of the houses also furnish printed circulars regarding the extent of their business, with other facts of interest concerning the killing department. The conditions are such that no person need fear the soiling of the dress in going in these places.

THE MARKET CLASSIFICATION OF LIVE STOCK.

Live stock of all kinds is arranged in the market into classes and grades. These vary more or less according to the market, and even in the same market they are not always the same.

BASIS AND OBJECTS OF CLASSIFICATION.

A class comprises the animals suited to certain commercial purposes. Within each class are grades of the same, depending on differences in size, quality and condition. At the present time the market classifications are not satisfactorily established. This is because those who establish and use the more or less elastic classification make no systematic effort to adopt any fixed standards that shall be generally accepted. It is highly desirable that definite classes and grades be established for several reasons, among which are the following:

First. That buyers and sellers on the market may transact business on a uniform basis.

Second. That country customers may not have to familiarize themselves with more than one set of standards to properly comprehend market quotations.

Third. That the press may publish uniform and reasonably consistent live stock quotations.

There may be but a slight degree of variation in the grades on occasions when they closely approximate and merge into one another, but even this should not work to the prejudice of such a classification.

In general, all over the United States in the different markets, live stock is classed according to its special adaptation, and each class is graded largely on a basis of size, quality and flesh. A meat-producing animal of high grade, whether cattle, sheep or swine, must have these essential qualifications: Form blocky, the back broad and level; hind quarters square and full on top and thick through the thighs; the shoulders smooth and well set back into the body; the chest broad and full; the neck small and short, with a head of medium size, graceful in outline, with prominent quiet eyes, broad forehead and large nostrils; the body deep and full in outline, supported by short legs with strong fine bone. A fattened animal of this class should have the framework of the body smoothly covered with meat, so that it will feel firm yet mellow to the touch. The coat of hair should be fine and silky, with a glisten which shows quality, and, in case of cattle, the skin should feel soft and elastic in the hands.

A matured, well-fleshed animal meets the highest market demand when it most nearly approaches the character just outlined. The more deficient the animal is in conformation (as for example in spring of rib, heart girth, length of leg, etc.) and quality, the lower it will grade in its class. In a general way the grades in each class may be designated as prime, choice, good, medium and common. Market quotations may not on all occasions make use of these terms, for the reason that animals of some grades may be lacking. For instance, the market for one day may offer no prime steers, choice being the best grade. Still, it is rather difficult to draw the line between these two grades. Each represents a superior product, and an animal might be prime on one market and choice on another. Usually with meat stock within a certain class the highest grade animals weigh the heaviest, although this is not always the case when differences of age are considered.

Horses, cattle, sheep and swine are differently classified and graded. The grades, however, of prime, choice, good, medium and common may readily have an application to any kind of stock. The market classifications which follow fairly illustrate the practice in American markets. Those of Chicago have the greatest application, as they affect by far the largest trading community. Those of Indianapolis and Pittsburg are given to illustrate the practice in other markets of importance.

HORSES AND MULES.

All horses may be placed in four groups, in a general way, viz: (1) light, (2) coach or carriage, (3) draft, and (4) pony.

The following is a typical Chicago daily classification, with grades and prices quoted, as given in the Drovers' Journal.

Classes and grades of horses on Chicago Market, with prices quoted.

Class.	Poor to Fair.		Good to Best.	
Drafters	$125 to	$175	$180 to	$250
Loggers and feeders	75	135	140	195
Chunks	65	95	100	140
Expressers	110	150	160	185
Farm mares and small chunks	50	65	70	110
Light drivers	65	135	150	200
Actors and coachers	100	175	200	450
Carriage pairs	250	350	375	700
Western (branded)	12	30	40	55
Plugs and scrubs	10	20	25	....
Mules	60	160	165	210

In the above classifications, drafters, loggers and feeders, chunks, small chunks, and expressers, represent animals of a wide range in size, from heavy draft down to small chunks, but in each instance a blocky, drafty form is desired. Farm mares represent a light type of draft, such as farmers often designate "general purpose" horses. Drivers include various light horses, such as trotters, pacer, etc. The thoroughbred and saddle horse come in the light-horse class, but are not strictly drivers. Actors, carriage and coach horses belong to the one general group. There are other classes introduced, and the terms light, medium or heavy may be used in reference to each different class of horses and mules. The latter, in fact, are usually graded on size and quality, the larger, taller mules bringing the higher prices. There are consignments of horses of inferior value, classed as southern, western, etc., which constantly find their way into the large markets; but they lack, quality, size and training, and those from the range are usually branded. Plugs and scrubs constitute the lowest class on the market.

The relative value of the animals of the different classes are clearly brought out in the prices quoted.

CATTLE.

After an extended study of market cattle in the Chicago yards, Prof. H. W. Mumford, of the Illinois Agricultural Experiment Station, published a classification of cattle, concerning which he gave detailed descriptive notes. The following are the general classes as given by him, each of which he subdivides into grades. The brief descriptions of these classes have been condensed from Professor Mumford's notes.

General Classes.

(1) Beef cattle. This class includes all grades of fat steers and heifers; also everything from common to prime and from light to heavy. It is finished condition that brings animals into this class.

(2) Butcher stock. This class includes animals that have not fattened well; also animals that have not been fed long enough to become properly fattened. It seldom includes steers of really good quality, as such will usually be sold as feeders. The bulk of butcher stock is made up of cows and heifers.

(3) Cutters and canners. In this class are included old, thin cows and very thin bulls, steers and heifers. The cutters must carry sufficient flesh to permit of the loin or rib both being used for cutting on the block. The animals which are so thin that no part of the carcass can be used for block purposes constitute the canners.

(4) Stockers and feeders. This class includes calves, yearlings, two-year-olds and older cattle. Cattle eighteen months old or older which are ready for immediate use in the feed lot are called feeders. Those which are younger are referred to as stockers.

(5) Veal calves. This includes all calves which are sold for immediate slaughter.

Special Classes.

The above general classes really comprise everything in the way of cattle sent to the markets. But there are a number of special classes generally recognized which require to be named and defined.

(1) Texas and western range cattle. A few years ago the typical Texas steer had very long horns and long legs, was thin and narrow-bodied, and carried a large deep brand; and most of the cattle which came from Texas were of this description. But this type is rapidy disappearing. Animals of the best beef breeds have been imported into the State and used for breeding purposes, especially for crossing with the native stock, so that now many of the Texas cattle compare favorably with those from other sections of the country. There is, however, a very wide range between the best and the poorest.

The western range cattle are classed with the Texas cattle, because formerly they were made up largely of southern cattle which were driven northward to winter on the ranges north of the quarantine line. Now, however, a large percentage of the animals in this class are bred on the ranges of the West and Northwest.

All the cattle in this class are branded.

(2) Distillers. These are cattle that have been fattened on the by-products of distilleries. Formerly only inferior grades of cattle were purchased for feeding on distillery residues, but at present many feeders of better grades are used. When sent to market these cattle are preferred to others of the same grade, because they dress out a higher percentage of beef.

(3) Baby beef. This term is applied to choice or prime fat steers between one and two years old, weighing from eight too ten hundred pounds.

(4) Export cattle. The cattle exported are in the main good to choice steers, weighing from twelve hundred to fifteen hundred pounds. Comparatively few prime beef steers are bought for export, because of the high price they bring in the home market.

(5) Shipping steers. This term applies to the animals purchased in the Western markets for shipment to the large Eastern markets of the United States. They are mainly of medium and good grades and range in weight from eleven hundred and fifty to sixteen hundred pounds.

(6) Dressed beef cattle. This class includes such cattle as are purchased by the large packing concerns of the Middle West. The packers prefer medium to choice steers, weighing from twelve hundred to fourteen hundred pounds, to make up the bulk of their purchases, but conditions of supply and demand cause them to purchase animals of a much wider range in grade and weight, the extreme range in weight being from eight hundred to seventeen hundred pounds.

Stags. This class includes such animals as have reached or at least approaching maturity before castration, and hence have the general conformation of bulls. Comparatively few of these come to the general markets, and they are of a wide range in quality, condition and weight. A few are good enough for export, while the poorest must be sold for canners.

HOGS.

The market does not provide so wide a classification of hogs as of cattle. They are largely classed on weight and quality, as is seen in the following classifications and quotations at Chicago, from the Live Stock Report:

Classes and Grade of hogs on Chicago market, with quotations

Assorted light	$6.00 to	$6.40	Common packers	$5.40 to	$5.60
Good to choice medium weights	6.20	6.30	Pigs, 120 to 140 pounds	5.00	6.00
Good to choice heavy	5.75	6.00	Pigs, 120 pounds and under	4.50	5.75
Fair to good heavy	5.60	5.75	Skips and culls	3.00	4.50
Good to choice mixed	6.10	6.25	Stags	4.00	4.50
Common to fair mixed	5.85	6.00			

East of Indianapolis quotations on hogs usually give a class known as Yorkers. These are light weights of three grades, such as are in demand for cutting up on the block in New York City. Heavy Yorkers range from one hundred and sixty to one hundred and eighty pounds; medium, from one hundred and forty to one hundred and sixty pounds, and light from one hundred to one hundred and forty pounds. Pigs of this class grade under one hundred pounds.

The grades based on weight will not hold the same in the same market, but will occasionally vary to meet the packers' demands. It may be noted also that on the same date the grades based on weight may differ in different markets.

The price quotations on hogs vary more on weight than quality. The latter feature, of course, always materially assists in securing the highest price, but the demands for weights vary. Sometimes the market quotations are highest on light hogs, and then, perhaps in a relatively short time, heavy hogs command the highest price from the packer. A weight of two hundred and twenty-five to two hundred and fifty pounds for well fattened hogs will, under average conditions, probably be most in demand.

SHEEP.

The following classification and quotations from the Weekly Live Stock Report of Chicago, representing that market, is about as comprehensive as is published:

Classes and grades of sheep on the Chicago market, with quotations.

Choice western wethers	$3.75	to $4.00	Choice heavy native ewes	$3.00	to $3.60
Fair to good western wethers	3.50	3.65	Fair to good native ewes	3.15	3.40
Choice western yearlings	4.15	4.25	Cull native ewes	2.00	2.50
Fair to good western yearlings	3.85	4.00	Choice native spring lambs	5.65	5.75
Choice western ewes	3.35	3.50	Fair to good native spring lambs	5.15	5.50
Fair to good western ewes	2.85	3.15	Common and medium lambs	4.50	5.00
Western cull ewes	1.50	2.25	Cull spring lambs	3.25	4.00
Choice western lambs	5.25	5.50	Feeding sheep	3.35	3.50
Fair to good western lambs	4.85	5.10	Feeding yearlings	3.60	3.75
Choice heavy native wethers	4.00	4.10	Choice feeding lambs	4.50	4.65
Choice light native ewes	3.50	3.60	Fair to good feeding lambs	4.15	4.40

It will be noted that this classification embraces western wethers, yearlings, ewes and lambs, and natives wethers, ewes and lambs. Western sheep are from the ranges of Montana, Wyoming and other states beyond the Mississippi, and are strongly impregnated with Merino blood. They lack the middle wool or mutton element which is more characteristic of the sheep from states east of the Mississippi. Western sheep and lambs weigh lighter and dress out less fat than Eastern stock.

MAKING A SHIPMENT.

Making arrangements. Where one is to ship by freight it is customary to make arrangement in advance with the railway agent and have one or more cars switched and placed ready for loading. Advance arrangements are necessary, because cars may have to be obtained from some other point on the railroad, and, in any event, special switching orders will, as a rule, be necessary. In a smaller town or city two or three days' notice of shipment is usually expected from the consignor. Even in the largest markets one day's notice to the railroad is desirable.

Feeding and care during shipment. Feed, water and care en route are always given live stock when an attendant does not accompany the shipment. It is, however, necessary that the shipper furnish feed and some utensils. For horses, cattle and sheep shipped in a stock car a supply of hay must be placed in the racks in the car. In case of a small shipment the hay may be placed in a rough rack or on the car floor. For a carload lot a supply of hay may be placed along the side of the car, being, in some cases, fed through trap-doors in the roof into the racks in front of the animals. On brief runs and on express freights feeding is not usually practiced. Hogs when shipped loose in the car are usually fed corn on the ear.

Crated animals sent by express must have crates bedded and feed attached to crates on outside for long journeys. Properly made crates will have a sack pocket fastened at the end within the crate in which hay may be stuffed, which sheep or calves may nibble at leisure. A small V-shaped trough may also be placed in the end of the crate, in which grain may be fed. If these additions to the crate are provided, the agents along the line will see that the stock is watered.

Shipping crates should be neither too large nor too small, just giving room for an animal to stand erect comfortably. The width should be only three inches greater than the width of the body at the hips and shoulders. Much room is objectionable. Animals firmly crated, with suitable feed acompanying, can be expressed from the Atlantic to the Pacific with no trouble or injury under ordinary shipping conditions. Crates should be light yet strong.

Water is always supplied by railway and express agents along the line. If an ordinary car is used, and the journey is a long one, then a half barrel in which water can be placed should be put in a box stall convenient to the animals. A slab of wood on the water will help to keep it from slopping out. Regulation stock cars are provided with water troughs, which are usually filled at points along the line, where water from hydrants is convenient. These may be filled according to the season and demand for drink; in warm, dry weather much more water is required than at other times. Under such conditions hogs need special attention. At some points along railways in the West, water pipes with flattened iron nozzles are inserted between the slats of the car. Water is then turned on from reservoirs and the hogs are drenched. This refreshes them and brings them to market in much better shape than they would be otherwise.

Feeding steers preparatory to shipment. Feeding steers preparatory to shipment and en route is a matter of importance. John Clay, jr., a well known buyer of Chicago, suggests the following:[a]

"A day or two previous to shipping, feed the cattle in a pen, and feed hay only. The secret of shipping all classes of cattle is to place them on the cars full of food, but with as little moisture as possible. A steer full of water is apt to have loose bowels and show up badly in the yards. Properly handled cattle should arrive in the sale pens dry behind and ready for a good fill of water; not very thirsty, but in good condition to drink freely. Many shippers think that by salting their cattle or feeding them oats they can fool the buyers, but it always goes against them to use unnatural amounts."

Mr. J. A. Funkhouser, writing for the the Breeders' Gazette (January 18, 1893), on feeding steers for least shrinkage in a four hundred mile journey, advises feeding all the hay they will eat and reducing the grain one half for two or three days prior to shipment. If fed during transit he would feed two hundred and fifty pounds of hay and one and one half bushels of corn per car.

Discussing this same subject, A. L. Ames writes:[b]

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[a] Live Stock Report, Chicago, September 28, 1894.

[b] Wallace's Farmer, June 19, 1903.

"What causes heavy shrinkage in cattle? In my judgment it can be traced directly to three causes—water, weariness and excitement. I have found that steers having to ride from two hundred and fifty to three hundred miles are in the worst kind of condition if started on all the water they can hold. On the day before shipping give your cattle about half their usual feed, at the same time and in the same way you have been in the habit of feeding. Give them at the same time all the good bright hay they will eat, and if you have anything extra in quality now is the time to use it. Get them just as full of hay as you can. Now, in the morning, if you have time before moving the cattle, give them all the grain they will eat, and start them of the feed yard."

Attendants. An attendant usually, though not always, accompanies large shipments by rail. It is customary for railroads to allow one attendant to a carload of stock, and usually he will be given accommodations in the caboose. It will be necessary for him to see that the stock is at all times properly cared for, and at the end of the journey that the car containing it is placed at the right station, convenient for unloading. A competent attendant in shipments to metropolitan stock yards may often save unnecessary switching in the yards by insisting on a prompt placing of the car or cars containing live stock. One of the most objectionable features of shipping by freight comes from injuries received by stock from the severe and sudden stops in switching, when heavy animals are thrown against the sides of the car or against one another, or are thrown to the floor. A watchful attendant, by properly placing his stock within the car, may prevent animals becoming bruised in this way.

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PROCEEDINGS OF THE IOWA STATE DRAINAGE CONVENTION.

HELD AT THE IOWA STATE COLLEGE, AMES, JANUARY 15 AND 16, 1904.

Pursuant to the order of the Iowa State Drainage Association, the proceedings of the State Drainage Convention held in Ames, January 15 and 16, 1904, are published in the following pages.

Hundreds of earnest enthusiastic farmers. land owners. engineers and lawyers from all sections of the State attended the convention. They came because they had been face to face with serious drainage problems and realized the absolute necessity for united effort in behalf of better things. The sentiment which dominated the convention was one strongly in favor of a new. adequate and constitutional drainage law. The members present earnestly advocated that every legitimate effort be put forth to secure the passage of such a law by the present legislature.

A strong legislative committee. appointed by the chair, was instructed to prepare a drainage bill and to do all in their power to secure its passage by the present legislature. The committee has been faithful to its trust and the full report of the recent convention is now published in the hope that it may aid in crystallizing a widespread public sentiment in support of the "Committee Drainage Bill," known as House file 120 and Senate file 97. Without doubt if this bill becomes a law, a series of drainage improvements will be started and carried to completion, which in the near future will increase the agricultural wealth of the State almost beyond computation.

W. H. STEVENSON.
Secretary-Treasurer.

Ames, Iowa. February 10. 1904.

EVENING SESSION, JANUARY 15TH.

The convention was called to order by Prof. C. F. Curtiss, who introduced the college president, Dr. A. B. Storms. Doctor Storms stated that the hour had arrived for the meeting, and, as the convention had a full program, he did not desire to take up time. "You are here to look at this question from the agricultural. social and political side. You are here for business. Professor Stevenson has been draining the State of Iowa and has a bucketful of results that I know you wish to receive, while Professor Marston has bounded the duties of the drainage engineer and defined his position quite clearly.

"Gentlemen, in the name of the college I bid you welcome, our latchstring is out, and I wish for you a prosperous convention that shall do a positive good for the State."

Introductory to the program, Professor Curtiss said: "There is no question at the present time more vital than the drainage of our soil. A few years ago some would-be scientists said we were making a mistake in our drainage plans; that we would draw all the moisture out of the soil with our tiling. The past two seasons have furnished sufficient evidence to entirely dispel such doctrine.

"The matter of drainage lies at the very foundation of successful agriculture, there can be no satisfactory cropping until surplus water is disposed of.

"Drainage systems and drainage laws need to be studied with the utmost care. Drainage is closely connected with the problem of good roads. The statistics gathered by the Department of Soils at this college indicate the inadequate drainage and the great losses the State suffers from this source.

"Tile drainage has only been used for little more than half a century in this country. The first tile used were imported from Scotland in 1833, and the first machine for tile drainage was made in New York in 1848. The pioneer farmer in tile drainage was ridiculed by his fellow farmers, who said he was 'putting crockery into the ground to bury his money.' The farmer of later years who carefully drained his wet farm and saw its effects upon his crops and realized increased profits in his harvests, exclaimed with earnestness, 'Verily, I believe the whole earth should be drained!'

"The past two seasons have revealed to us, as never before, our faulty drainage, and I trust that they may yet prove a blessing to us by giving us a better system of drainage. It is as necessary that we have well drained land in a dry season as in a wet season.

"The drainage problem will help us to solve the good roads problem. This convention has been called to give an expression of opinion on this work and plan for definite action."

PRESENT DRAINAGE CONDITIONS OF IOWA.

Prof. W. H. Stevenson, of the Department of Soils of Iowa State College, presented a large fund of exceedinly valuable data regarding drainage conditions of Iowa and spoke in part as follows:

"Soil problems are today receiving careful attention in almost every state and territory in the Union. They lie at the very foundation of our successful agriculture. It is true that these problems are widely different in different states, but all of them are important. Therefore it is right that they should receive the attention which they are now receiving at the hands of the farmers and others who are interested in the improvement of American agricultural conditions. In the far East we find the experiment stations and farmers standing shoulder to shoulder in their investigations, studying the use of commercial fertilizers and learning how they can bring back to their fields the fertility that has been wasted by careless handling. In the Southland of our country we find the landowners face to face with the same problems. In Illinois, also, although we think of that commonwealth as one of the richest roiling states of the Central West, we find the thoughtful farmers earnestly studying soil conditions. In the West, alkali and irrigation are demanding the attention of land owners and Government experts. In this State we have our peculiar soil problems. It is not strange, and the fact that we have these problems is our reason for investigating and studying them in their relation to Iowa's agricultural progress. When I first came into this State I was impressed by the fertility of the land as indicated by the wonderful growth of the grains and grasses. On every hand the fields gave evidence of an abounding fruitfulness. But there was one blot upon the landscape. As far as the eye could see, in many sections of the State, could be seen innumerable low, wet spots, wholly or partially unproductive. These areas, some large and some quite limited, were thus unproductive because of inadequate drainage. There is no question about it. You know that it is true. In fact, as you traveled here to this convention, you found here an acre and there an acre unproductive or partially unproductive all owing to the fact that it was not adequately drained. A few years ago the fact that drainage conditions ougnt to be improved in this State grew stronger and stronger. In the fullness of time it became evident that something ought to be done, all with the intent of bringing this problem nearer to the people and land owners of the State. Therefore it seemed wise that the department of soils of this college should institute investigations which would furnish some valuable data that could be tabulated and later sent to the people of the State for the purpose of crystalizing sentiment in favor of more adequate laws, something that would not only make men believe in these important drainage problems, but also lead them to act. We have sent out not less than four thousand letters to almost every township in your State, and about two thousand replies have been received in reply to the questions which were asked. It was our purpose to find out just what the drainage conditions of this State are. We did not go to any particular section or township or county, but we went to the farmers of the State; to men many of whom were personally known to us, and asked them to give us answers as fair and comprehensive as they possibly could. These two thousand letters have brought us data which ought to be of real value, for they come from men who have land to drain and who are interested in better drainage and better tiling of the land. Tonight I do not want to weary you with a great number of figures, nor with a mass of statistical matter, but we have some data which I believe will be of interest to you.

(At this point Professor Stevenson explained clearly and rapidly the charts which were hung upon a screen upon the platform, giving the following data):

PRESENT CONDITION OF FARM LANDS.

County or District.	Size of farm.	Per cent partially lost.	Per cent wholly lost.	Per cent of farms with no outlet.	Per cent of farms requiring ditching.	Per cent of non-productive land in township.
Humboldt	249.0	26.0	17.9	97.5	87.5	29.5
Boone	167.4	14.1	3.7	60.0	38.1	19.4
Jefferson	182.2	73.3	3.6	16.7	16.7	27.5
Monona	379.6	69.4	43.4	77.7	88.8	36.3
District No. 2	272.8	25.7	10.1	69.5	55.6	18.9
District No. 5	197.2	14.5	6.7	53.2	23.3	12.1
State	249.1	16.4	6.7	40.1	25.9	12.4

STATEMENT OF PROFIT AND LOSS.

Counties.	Number of acres non-productive.	Annual loss.	Profitable limit of expenditure.	Cost of Drainage.
Humboldt	82,383	$ 411,915	$ 8,238,300	$ 2,059,575
Boone	70,000	350,000	7,000,000	1,750,000
Jefferson	73,750	368,760	7,375,200	1,843,800
Monona	140,401	702,005	14,040,100	3,510,075
State	4,321,792	$21,608,960	$432,479,200	$108,044,800

Annual loss to the State	$21,608,960
Value of wheat in State	12,860,000
Value of oat crop in State	26,114,000

"The facts brought out in the above table show most conclusively that a large amount of draining and ditching can be carried on with profit in our State. By converting these percentage figures into actual acres the need for drainage becomes still more apparent. In regard to the non-productive land, using round numbers. Humboldt county had 82,000 acres of such land; Boone county, 70,000; Jefferson county, 76,000. and Monona county 140,000 acres; while in the entire State the amount of non-productive land reaches a total of 4,322,000 acres. Figuring that the non-productive land of the State would bring even as low an income as $5 per acre after it is properly drained, we would have the enormous sum of $21.610,000 per year as increased profits. This income represents the interest at 5 per cent on a little over $432,000,000.

The annual cost of draining the entire State, using the figures given above and considering the average cost of the operation to be $25 per acre, would only amount to about $108.000,000, or in other words, the money expended for drainage would pay an annual interest of 20 per cent on the investment. That a revision of our present drainage laws is sadly needed is shown by the fact that 40 per cent of the farms needing drainage have no outlet, and that over 25 per cent of them would be benefited by a drainage ditch of some kind.

"These figures have been secured primarily to bring the attention of the farmers and legislators to our pressing need for the revision of our drainage laws as a preparation for more adequate drainage. This data came from the people of Iowa, from the farmers, from the land owners. It is presented simply to bring before the people of this State these facts as they really exist. We could undoubtedly offer you some other reasons why we should have drainage, we could name the many benefits which adequate drainage brings to the land, but the one thought that I wish to leave with you this evening is that drainage is a good financial proposition; that it will pay you a handsome income for every dollar which you expend for this improvement. Drainage in this State is a good paying proposition. It is not an experiment. We can go to Illinois and we find some of those low, level countries which were a few years ago almost or wholly unproductive.

"A man in that State told me that a piece of wet land which only brought him a small return a decade ago, was made very productive after a ditch had been put through. Champaign county, Illinois, was low and flat, and today it is one of the greatest corn counties in the United States. It was drained and the ditches were opened, and prosperity has come to the people of that county, and it will come to us if the land owners of Iowa will take up this work of drainage as energetically as did these people in a neighboring State. I will ask you to give thought to this point of financial prosperity; take these thoughts home with you: present them to your neighbors for their careful consideration; and labor with your legislators for a just, comprehensive and constitutional drainage law which will give us adequate drainage."

GENERAL DISCUSSION.

At the suggestion of the chairman, a general discussion of the question of drainage was taken up. The chairman called on Senator Brooks, who said: "This is a great place for farmers to be; as I speak tomorrow morning, I will not scatter my audience by speaking now. I feel this is a most important question and that we should weigh it carefully."

At this point Lawyer Hammill was asked the following question: There are two quarter sections of land. Quarter section A receives the surface water of quarter section B and there are no ditches. Has the owner of quarter section B the right to tile drain his land and pour the result of his tile drain, without the consent of his neighbor, upon his farm? Lawyer Hammill answered, "No, according to the present law he can not tile drain without the consent of his neighbor." 'Then," said the questioner, "the progressive farmer of quarter section A has the power to 'bottle up' the progressive farmer on quarter section B."

Mr. Inman, of Wright county, said: "I am happy indeed to find this audience here tonight. I am happy in the thought that this drainage question has begun to stir the people of the State of Iowa. The thought that is raised when one considers drainage conditions is one that is intolerable. This unprogressive farmer at the lower end of a fertile slope may not only 'bottle up' one, but a whole line of progressive farmers above him. The drainage laws of Iowa do not at all fit our present conditions. They must and they will be remedied. Water has to run down hill. The man below may legally injure himself and injure the entire slope above him. The water will accumulate to his damage, and it will be retarded to the damage of all above him. Our law should be remedied. The common sense of the people of Iowa will not tolerate any other thought. It is a constitutional question and we must be patient until we can remedy it."

Mr. J. Z. Adams, of Harrison county: "I live in the flooded districts of Harrison. We have been patient for five years out there and our children have been living on tadpoles for a long time, and we have got to the place where patience ceases to be a virtue. Is it possible that the people of Iowa can not take hold of this and bring about a little bit of legislation and ditch the State? Out in the western part of the State our drainage district is quite different. We have to take care of water which runs from the high land down upon us. A good old farmer said to me upon the train today, 'We have got to go to work and get some laws through the legislature to remedy these laws, or we have got to make the d——— lawyers keep their mouths shut.' We have got to do something. We must do it."

Lawyer Clarence Baker, of Centerville: "I want to say you can't keep the lawyers' mouths shut. The only constitutional question which our legislature will run up against this winter in the drainage question is obtaining the right of way of these ditches. These ditches can be built if we only make the assessment greater on some of the lands. The legislature can this winter change the drainage laws. They have got to be pushed."

Mr. J. T. Drug, of Stratford: "I find that in drainage engineering work that they are attempting to establish, when people get to understand one proposition more thoroughly, results are obtained more quickly. If my land is located below a large swamp, and the water from the swamp passes over my land, when those lands are drained I will have less water to take care of. When we are putting a pipe line through a man's land we are not taking any of his land; he can cultivate over it. We can not build an open ditch without taking land. It is when you have to build an open ditch that you have to take land away. Whenever you drain large swampy areas above, there will be less water to pass through the land below after they are drained than before, and consequently less damage than before. Pipe lines can be run when open ditches would not be permitted without expensive law suits."

By vote of the house, the chairman was instructed to defer further discussion until the program of the evening session was completed. Prof. Anson Marston, professor of civil engineering, Iowa State College, was then introduced, and gave a very practical paper on "Drainage Engineering."

"Drainage Engineering Notes," a neat, attractive booklet, prepared by Professor Marston, giving valuable statistical engineering information, was distributed through the audience while Professor Marston read the following address:

DRAINAGE ENGINEERING.

Drainage engineering is a side of drainage about which the general public has very little opportunity to learn. There is a great deal published and said about the importance and value of drainage to the land owner in reclaiming areas of land before entirely waste, and in making other areas more productive, and it is true that too much can hardly be said about these benefits, for they are the main objects for which land drainage is undertaken. We can not be too well informed regarding the scientific principles and practical methods by which these great results are attained. However, while directing our attention to the cultural and sanitary sides of drainage, we should not forget the work of the drainage engineer, without whose services it is impossible properly to plan and carry out drainage work.

The drainage engineer is a product of modern civilization, for although something in the way of drainage has been attempted ever since ancient times, it is only with the recent past that serious efforts have been made to reduce the principles of the art to systematic form. Even yet there is still a great deal of work to be done to collect the data and perfect the practice which forms the basis of drainage engineering. Especially in the parts of our own country in which drainage has been undertaken mainly in recent years, is there much to be done to secure the data by which properly to adapt the practice of drainage to local conditions.

In Iowa we have too often entirely forgotten the existence of the drainage engineer, or have decided to "save" his fee by dispensing with his services. I have heard of one farmer who has spent a large sum for drainage, and who estimates that he lost $500 by not employing a competent engineer. The wet seasons of 1902 and 1903 have shown in a forcible way the disastrous consequences to Iowa farmers of ill-advised plans and improper construction in drainage work. Generous fees for competent engineers could have been paid many times over from the losses to the crops of the State in these two years alone. The writer imagines that the results would be startling could exact data be collected showing in how large a percentage of cases tile drains have proven inadequate because too small or laid at too shallow depths, and the chances are that we would be considerably astonished could we learn exactly how often tile drains supposed to have been laid to true grades have been found choked with mud because actually built on a grape-vine twist. Even where an engineer has been employed he has too often been forced to take the position of a mere surveyor to set grade stakes (which the ditcher follows or not as he pleases), instead of being retained and paid to prepare comprehensive plans for the entire drainage system on an adequate scale, and by personal supervision to see that such plans are properly carried out.

Drainage engineering, like law and the practice of medicine, requires so high a degree of technical skill that it is unreasonable for the untrained individual to think he can do his own drainage engineering as it would be for him to insist on doing his own doctoring. In fact, drainage and the practice of medicine are alike in one important particular—

in each the mistakes are covered up in the ground out of sight. Just as if employing a physician, we must select the best, because his mistakes, once made, can never be corrected, so in drainage we should not employ merely *some* engineer, but a *competent* engineer. Having employed such a man, we should take his advice.

Speaking of the necessity that the drainage engineer employed should be thoroughly competent, leads us to the subject of what qualifications are required to make him competent. In this connection it may be said, in the first place, that the common impression that the most important part of a drainage engineer's work consists in surveying, and that his principal necessary qualification consists in being a good surveyor, is a great mistake. It is true that complete and accurate surveys are absolutely essential in drainage work, and especially is this true in regard to accurate levels. No piece of drainage work should be undertaken without such surveys and levels, which will therefore constitute a considerable and important part of the drainage engineer's work. But after all by far the most important part of drainage engineering is of a greatly higher grade than the mechanical work of mere surveying. It consists, first, in the planning of the system, so as certainly to secure the best results in spite of all the disadvantages to be overcome with the expenditure of the least possible sum of money, and, second, in seeing that the plans are faithfully carried out in construction. This kind of work can be well done only by the aid of the best training, the best intelligence, the best common sense, the strongest will power and integrity. As we must pronounce the brain of man a more delicate and wonderful instrument than the transit, and as a strong human character is more priceless than the finest level of precision, so we must acknowledge engineering to be on a correspondingly higher plane than mere surveying. The competent drainage engineer will guard against mistakes in his surveying by readily applied checks, but the only check against mistakes in design and construction, the fatal mistakes, is the ability and strength of character of the engineer himself.

Someone has defined the engineer as "a man who can do with one dollar what any man can do with two." In drainage engineering we need to modify this and say, "the drainage engineer is the man who can do with one dollar that upon which the average man will spend two and still fail."

The competent drainage engineer, therefore, requires the highest qualifications. First of all he must be an able, honest, faithful, industrious, tactful but strong-willed man, possessed of the best judgment. Second, he must have a thorough training as a civil engineer, for there is no branch of that great profession which may not at some time have a direct relation to drainage work. Third, he must have had an extensive experience at actual drainage work, for no man can properly be entitled an engineer in any special line until, in addition to his general knowledwge, however extensive, he has had thoroughly impressed on his mind by actual experience the thousand special applications and modifications which are absolutely essential in each line of engineering work. The most skilful pilot could not safely guide his ship on an unknown coast.

In acquiring this special training the drainage engineer will draw from almost every profession and science. From agriculture, first of all, he will learn the theory of the soil and of plant life, so that he can understand the physical, chemical and bacterial conditions of the soil necessary to produce the best crops and the exact effect of drainage on all these points. From geology he will learn to determine the nature of the underground strata which he may encounter in different localities. From physics he will learn the laws of underground water and its movements. From botany he will learn to judge of moisture conditions by the species of plants growing in different localities. From medicine he will learn how drainage may improve the public health by removing miasmatic emanations, which from the earliest settlement of the country have poisoned entire neighborhoods. To all of these sciences and professions and to many others the competent drainage engineer must acknowledge his indebtedness.

This paper has not been written to give instruction to drainage engineers, to whom it would be more fitting that the writer should apply for instruction. The object of the paper is mainly to aid the general public interested in drainage in Iowa in acquiring information concerning the importance and necessity of the drainage engineer's work. To accomplish this object, however, it seems necessary to discuss some of the details of the drainage engineer's work, for the land owner contemplating drainage wishes to know exactly what he has a right to expect from the engineers he employs, and exactly how much engineering work it will pay to have done. We will, therefore, glance briefly at some of the detail of drainage engineering work; first in tile drainage and second in the construction of large drainage ditches. In tile drainage we have to deal with the drainage of comparative small tracts of land, usually individual farms, while for open ditches the case is usually that of the drainage of large tracts.

In the case of tile drains, the engineer, before construction, has to make the survey, prepare the plans and specifications, and set the grade stakes. In many cases, indeed, perhaps usually in past practice in this State for single farms, the surveys have consisted simply of a line or two of levels, the plans of nothing but a profile (if even so much was furnished), and no specifications at all have been prepared. The writer wishes to be plainly understood as strongly advocating a great improvement in this respect. From the very first careful forethought should be given, not merely to the perhaps small amount of tiling to be put in at the time, but to a final comprehensive plan for the entire portion of the farm which may eventually require drainage. Without such forethought from the first, the final result will be a patchwork arrangement, not worthy the name of system, in which the different parts can not properly do their work, and of which the total cost is far greater than would have been the cost of a complete and well planned system. In hundreds of cases in this State, doubtless, the land owner has found that the early drains he built were too small or too shallow to drain more distant acres later, so that he has had the work to do over. It will pay, when the first surveys are made, to have measurements taken and levels run sufficient to enable the first drains built to be intelligently planned to serve as parts of the final system.

Another feature of engineering work for farm drainage in which there should be great improvement is that of maps and records. At Ames, on the college farm, the present authorities have had predecessors who put in quite extensive amounts of tile drains without leaving accurate plats, so that in many places we can not now find even where the drains were built, to say nothing of their sizes, grades and depths. In making excavations old lines of tile whose very existence was not suspected, are not infrequently encountered, and the writer knows of places where at least two systems of tiles in the same locality have been put in by successive generation of authorities. The same, or a worse state of affairs must result on individual farms throughout the State, as time goes by and the farms change owners, unless the present almost total neglect of keeping complete records of all tile drains built is remedied. Even if the land does not change owners, men's memories fail, and the writer has often noted that even after a very few years men who actually help build drains are frequently unable to locate them within a considerable distance. Without complete maps showing the particulars of our drains, how can we hope to keep them in working order? The breaking and choking up of a single tile might render many acres of land worthless in a wet season, and cause enough damage in a single year to have paid ten times over for records which would have enabled the difficulty to be located and remedied at less than one dollar's expense.

Every land owner constructing drains should therefore call on his engineer for a complete map of all his land requiring drainage, on which the exact locations of all drains, together with their sizes and grades, and their depths below the surface at frequent intervals should be clearly indicated. Proposed drains for the future may also be shown, and as soon as any new drain is built it should also be noted on the map. Such maps should also show the natural features of the farm, such as water also be given, and on flat land requiring drainage these elevations should boundary lines, the locations of buildings, etc. The heights or elevations of the more important points as calculated from levels, should courses, boundaries of swamp, wet and flat land, division into fields, be given for numerous points. Contour maps, showing exact elevation- of all parts of the farm by contours drawn one foot apart vertically through all points at the same elevation, would be desirable if, as Mr. Elliott estimates, the surveying for one of a 160-acre farm can be done in two days. Another thing about both drainage plats and profiles is that they should not be made on opaque paper, but on tracing cloth, or in the case of profiles, on transparent profile paper. It then only costs a few cents to make a blue print copy at any time, and the original drawing need not be taken into the field at all, but can always be kept safely at the house along with the farm deeds.

The matter of specifications for the construction of tile drains is, in my opinion, very important, although almost universally neglected. Every engineer ought to prepare and always keep on hand regular printed specifications and forms of agreement between land owner and tile contractor, with blank spaces for filling in particular names and adding special clauses as individual pieces of work may demand, and he ought to furnish a copy of such printed forms with each set of plans he prepares. At present there is too often only a general verbal agreement between the land owner and the ditcher. There is no way to enforce good work in all particulars, and too often disputes and dissatisfaction regarding the agreement and the work arise which could readily have been prevented had there been written specifications and agreement. The specifications and form of agreement given on pages 121 to 125 of that valuable little book by C. G. Elliott, entitled "Egineering for Land Drainage," may be recommended as furnishing valuable suggestions along this line.

Another very important part of engineering for tile drains which is now too much neglected is close supervision by the engineer of the entire work of construction. The best plans and specifications will be of little avail if not faithfully carried out in actual construction. The land owner is not entirely by himself, able properly to supervise the work, for he is not posted as to the points requiring close watch. The engineer should set grade stakes for the entire work, and he should visit the work one or more times during construction to see that it is properly done in every way. With his level, after the tiles are laid, he should test the tile at frequent intervals before the ditch is filled to see that the work conforms to the grade stakes. In case unforeseen difficulties, such as strata of quicksand, are encountered, the engineer should be informed, and should test the work with especial care in such places. The engineer should see that satisfactory protection is provided at all outlets, and that good, smooth and tight junctions and easy curves are constructed.

As a final word of advice in regard to tile drains I would say, make them of ample size and put them down to a good depth, not less than four feet if possible, and certainly not less than three feet even in the very lowest ground. In case the drain must take surface water as well as under drainage, half the size can be saved by constructing over it, to remove the excess of surface water in heavy storms, a broad, shallow depression, which can be cultivated or kept in grass.

We come next to the subject of drainage ditches. These should be constructed only for quite large tracts of land, for ditches are a nuisance to cultivation and often do much damage by wash where there is a good fall, so that for all small tracts it is very much preferable to construct tile drains. Hence drainage ditches are usually constructed not by individual land owners, but by drainage districts, and this fact considerably affects the engineering side of the work. The two wet seasons of 1902 and 1903, occurring just at a time when Iowa land had become very valuable, have directed a great deal of attention to the construction of drainage ditches in Iowa. In some counties the projects are to be numbered by the dozen, and it has been impossible during the past year to find drainage engineers enough to make the surveys required by law. In some cases the ditches are of great magnitude and length. The subject is certainly one of great importance.

There are a few general points in connection with open ditches which may be very briefly discussed before going into the details of the engineering side of this question. One of these is the alignment of the ditch. The ideal alignment is a mathematical straight line, and while this is usually not possible to attain, yet in the case of both the tile drain and open ditches too little effort is usually made to secure favorable alignment. The drain is made to follow the tortuous course of some natural water channel. when at a little additional cost for deeper digging and small lateral tiles to the old channel, cut-offs could be made which would greatly increase the grade and capacity of the ditch and diminish the permanent disadvantages in cultivation. Wherever possible, as in the case of practically level land, the ditches hsould be located on the property lines or parallel thereto.

As to the shape of the ditches, it may be said that since tile drainage of the adjacent land will usually be profitable in the end. Mr. C. G. Elliott recommends that the ditches should be given a minimum depth of five to seven feet if possible. Moreover. deep ditches keep themselves cleaner better than shallow ditches. The sides should usually be given a slope of one to one. and the ditch will not be so liable to become choked if the bottom is made at least three feet wide.

A point in connection with drainage ditches which is often overlooked is that proper provision should be made from the first for maintaining them. A ditch choked by weeds or willows or by caving sides may prove of little value when it is needed most.

In regard to the details of the drainage engineer's work for drainage districts, the writer would urge that the surveys, and maps be made complete and comprehensive. All the natural topography. the property lines and the location of buildings should be shown. In addition, the elevations of important points. and of numerous points on all land requiring drainage, should be given. For assessment purposes the land should be divided into, first, rolling land (not requiring tiling), second. low land (which can be cultivated without tiling but would be benefited by it), third, wet land (which can not be cultivated but can be pastured without tiling). and fourth, swamp land (which can not even be pastured without drainage). The boundaries of all these classes of land should be located in the field by correct measurements. and accurately shown on the map, so that the number of acres of each class of land on each man's farm can be determined by the commissioners. The exact divide bounding the water shed, and often branch divides between different parts of the water shed, should be carefully located on the ground. using the level wherever necessary, and accurately indicated on the map. The exact locations and dimensions of the drainage ditch should be given, and profiles to a large scale constructed. All maps should be made on tracing cloth. and all profiles on transparent profile paper. blue prints being furnished for use in the field and the originals being preserved in a safe place.

A reform which the writer advocates for drainage maps and profiles is that they should all be made on a standard size of sheet, say eighteen inches by twenty-four inches, and those relating to each drainage district numbered and fastened together in book form in such a way that any one sheet may be removed. In case of maps too large for one sheet, sheet number one may show the entire district to a small scale, and the large scale map may be made in sections on 18x24 sheets. The writer uses this method in his sewerage practice and finds it perfectly practicable. Applied to drainage it would aid greatly in systematizing and preserving the records.

For drainage ditches the engineer should prepare complete specifications covering all phases of the work, and a careful estimate of the cost, which it would be better to have a little too large than not large enough. The engineer should advise in advertising for bids and awarding the contract. During construction his services will be constantly required. He must stake out the work, see that it is properly constructed, calculate the number of cubic yards and the amounts due the contractors, and perform many other duties of a responsible nature.

In making drainage assessments the engineer's advice will have great weight. Professor L. E. Ashbaugh, who has charge of the instruction in drainage for the students in civil engineering at the Iowa State College, uses the following method:

With map in hand the two commissioners and the engineer make a careful inspection of the entire drainage district, and record for each tract of forty acres (or less if owned by two or more parties), the quantity of land therein of the following classes: swamp land, wet pasture land, tillable land needing drains, and rolling land. While in the field, the forty-acre tract can be quite closely subdivided. In the office these subdivisions are tabulated and opposite each is placed the following factors, first, for swamp land 100 per cent or two thirds, for pasture land two thirds, tillable wet land one third, these amounts showing proportions to be taxed on account of condition of land; second, factors are then placed showing proportional benefits due to proximity to the drain: land through which the drain runs being assessed 100 per cent, while land at some distance is placed at 70 per cent or 50 per cent, or whatever seem just; third, factors are similarly placed to show benefits due to an outlet being provided, thus 100 per cent for land at upper end of the drain and decreasing to a small amount at the outlet. The product of the acreage of each subdivision into the factors just mentioned, gives the proportional part which is assessed to each tract.

The result of this method is: A property owner at some distance from the drain does not pay as much as one who is directly benefited by having the drain through his land. The man at the outlet pays little as compared with the one at the upper end who uses the entire length of tile. Assessment is made with reference to need of drainage. A review of records in your county auditor's office will show that oftimes men at the outlet pay more than their entire expense would be if they made a private drain, or that men a long distance from the drain pay as much as those most directly benefited.

In conclusion, the writer will call attention to the vest pocket "Drainage Engineering Notes," recently prepared for general distribution by the civil engineering department of the Iowa State College. A copy has been furnished each member of the audience. The principal feature of these notes is the tables of number of acres drained by different sizes of tiles and ditches. laid to different grades. These tables have been computed to meet in general the recommendations of Mr. C. G. Elliott. drainage expert of the United States Department of Agriculture, as given in his book, "Engineering for Land Drainage." Mr. Elliott is well known to us as an expert along these lines, and is to address you this evening. In computing ditch tables. however, the writer adopted Kutter's formula for the capacity of ditches, as much more reliable than the one recommended by Mr. Elliott (though not so simple), and the writer further assumed. as agreeing with working conditions in Iowa. that the ditches will be in only moderately good condition. containing occasional stones and weeds. or corresponding obstructions to flow. For ditches in thoroughly first-class condition 25 per cent can be added to the number of acres given in the table. and the results will even then be quite a little smaller than would be obtained by Mr. Elliott's formula.

Mr. C. G. Elliott, Drainage Expert of the U. S. Department of Agriculture, Washington, D. C., addressed the convention on

"DRAINAGE LAWS OF OTHER STATES."

A most important point in drainage is connected with the enactment of proper drainage laws. The early drainage laws of other states have in all cases grown out of the necessities of those states, especially in the older states where they have been a mere skeleton, to which additions have been made as agricultural needs have indicated. I might say. in passing. that these laws are peculiar in one respect. and that is, the lack of technicalities, the desire for simplicity, so they may be easily understood. In almost all cases they are furnished with the declaration that the law is to be construed liberally. I hardly know how to present this matter in a sufficiently clear and complete form when we have so many excellent drainage laws. I can merely allude to some of the salient points and show some of the differences which exist in the different laws that may be of use to those who have charge of the enactment of amendments for the drainage laws of Iowa. In Illinois the drainage laws have been declared unconstitutional. In 1865 a decision was rendered by the courts that no man had the right to drain his own land on his premises provided his neighbor below set up the claim that it in any way injured him, and proved it. At that time the whole drainage problem, the whole drainage work in the State of Illinois, was blocked by what was known as common law. The matter became almost intolerable, the deviation of water from natural channels was enjoined. just the conditions which the people of this State are in today with reference to the drainage problem.

(Here Mr. Elliott read a clause of the Illinois law, showing that the matter had become of great importance at that time.)

Defining right of individual drainage Mr. Elliott stated it was not found in any other drainage laws except the State of Massachusetts.

The drainage laws are usually suited or fitted to the existing laws. In Illinois a method is provided by which the cost of the work shall be distributed over the territory drained. Illinois has township organizations and administration under a board of county supervisors. The formation of a district in each township is by petition through the town clerk. We have the union districts in which there are two townships. Where the land is in three or more townships we have a special district. I may say that in Illinois originated the district system, or what is called the drainage districts. The Ohio law is very much older than the drainage law of Illinois, but it does not speak of drainage districts in any way, although it virtually provides for them. The land owners have abundant opportunity to be heard. They may appeal to the board of supervisors, who in turn appoint commissioners to hear the objections. The work of the drainage commissioner is amended to conform with changes made. I judge that there has been a good deal of implication on this point.

All drainage laws which have been made give the land owner the right to be heard and to present his objection in proper form. We find there have been a great many legal difficulties. In many cases the expense of these have exceeded the actual cost of drainage.

It is regarded as a safeguard under our methods that all of those things should be provided for, and in no case shall anyone having land in the drainage district, not have an opportunity for a complete hearing, first before the drainage commissioners, and, if not satisfied with their decision. may appeal to the courts and have the matter adjusted there.

The law of Indiana is one of the more recent laws relating to drainage districts and adapted to their needs. In many respects it is similar to the Illinois law. A petition is presented to the board of county commisioners. The petition shall be signed by one third of the owners of the majority of the land. When it comes before the board of supervisors this is referred to three viewers who bring report to the board of commissioners. The method providing for the assessment of these lands is the same in the drainage district of Indiana as in Illinois. They shall go on the land and divide it up in forty-acre tracts and shall classify them on the percentage basis. This forms a permanent scale which, remains in force and on record, and it seems as though it is a very desirable feature of the drainage law. We do not always assess sufficient amounts to do the work. These laws provide that other territory may be added and classified according to the scale. In Micnigan the drainage commissioner assesses the cost himself. No method is applied, but he assesses each tract of land at so much percentage.

The Minnesota law has a different method of assessment. The Minnesota law has been derived largely from the Indiana law. The viewers go upon the land and assess the amount of benefit which each piece receives. It is not especially dependent upon the acreage of each tract. They look as nearly as possible to the complete benefit which shall be derived. Then the total cost of the work contemplated shall be divided by this sum of total benefits of the whole district, which will give a cost to each dollar of benefit conferred. It was arranged that where it was considered tile drains would be sufficient that some of these small ditches would be changed and become tile drains.

Indiana's law fits more nearly your condition here in Iowa. It also provides that you may have districts as small as tracts held by two or three land owners.

The department has recognized recently the great importance of this subject. A year ago they made provision for some investigations which were begun in the arid regions. It is in that capacity that I have been able to visit the various states during the last fall. This work is under the supervision of the office of experiment stations. It is desired to extend this work. It has been well received. A new bulletin on drainage is now in the hands of the printer and may be obtained upon application to the Department of Agriculture. We expect to be able to extend this work during the coming year and render a personal assistance whenever it can be done.

I had hoped to be able to have a few copies of the Indiana law here for distribution. They may be obtained. I believe, from the secretary of State of Indiana. I thank you for your attention.

DISCUSSION.

At the close of Mr. Elliott's address, Mr. Robinson from Emmett county, opened a general discussion by saying:

I wish to say that there is no question in my mind about the need of a drainage law for this State. Feeling is intense. The feeling of those here is signified by their willingness to sit patiently and hear the most instructive remarks with which we have been favored. I am very much and heartily in sympathy with all of you here in regard to that matter. I realize that there are farmers here that are anxious and impatient that something be done along this line. The members of the legislature which I see here are farmers and lawyers and other classes of men whom I feel sure are anxious to take up this matter and carry it forward as much as any of you can possible be. The question is not how much is to be done, but how shall we do it and how can we get at it. It seems to me that the object of this convention would fall short if we did not at this time before the adjournment of the convention formulate some plan along which we could work together. It is my judgment that it should be taken up at the beginning of the session of the legislature and continuously worked at until some results are obtained. I wish to move that a committee of five be appointed by the chairman of this convention, of which he shall be a member, to co-operate with a committee of the house and also a similar number from the senate to take up this matter at as early a date as possible and present some legislation along this line.

A motion was made to amend this motion by deferring the action of the convention until the morning session, January 16th. The amendment was carried. and after considerable discussion the original motion as amended was carried.

Representative McAllister stated that he came to this convention to learn what the people wanted. He desired a full and free expression of what the farmers felt they needed along the line of drainage legislation.

Mr. Clarence Baker moved that the chair appoint the following committees:

Committee of three on permanent organization.

Committee of three on resolutions.

Committee of three on ways and means (to arrange for methods by which to raise money to meet the expenses of the convention).

The motion was carried and the chair appointed the following persons on committees as named:

RESOLUTIONS.

Mr. W. S. Kelly, of Harrison county.
Mr. H. Hinman, Wright county.
Mr. C. G. Elliott, Washington, D. C.

PERMANENT ORGANIZATION.

Mr. Sheldon, of Bremer county.
Mr. J. Z. Adams, Harrison county.
Mr. W. H. Warburton, Independence, Iowa.

WAYS AND MEANS.

J. Z. Adams, of Harrison county.
Mr. Clarence Baker, Appanoose county.
Prof. D. A. Kent, Jewell Junction, Iowa.

The chairman read the following letter from Mr. Will H. Ade, of Kentland, Indiana, who had expected to be present and take an active part in the convention, but was detained at home. The letter was received with a round of applause.

"I am very much afraid I will not be able to be with you on the evening of the 15th and I thought best to write you and send you under separate cover two copies of our ditch law, one for your own use and the other for the drainage committee in your legislature, if you will kindly forward the same.

"I have taken the liberty to make some marginal comments upon our laws and note the changes we hope to make this winter in our town legislature. I am not ready to say that I will not be with you, for I yet may be able to arrange to get away.

"I am very enthusiastic over your Northwestern Iowa country and sincerely hope that you will get a good law and proceed at once to reclaim your lands.

"I have owned several farms in your State and I never could understand why your people could argue that you did not need drainage. The last two years have been a blessing to you if it wakes them up at last. Our county here was just such land as Pocohontas county, Iowa, and our papers were full of sheriff sales and notices to sell farms at twenty-five to forty dollars per acre, and that only fifteen years ago. Now every farm is tiled; there has not been a farm sold at sheriff's sale for years and none are for sale, and I do not know of a farm in this township which could be bought for less than $125 per acre. Where we used to haul our grain eight or ten miles, we now have warehouses every three or four miles on all our railroads, and better still we are building in this county 130 miles of macadam roads, all easily traced to the benefit derived from proper drainage. I have some land here that was once as wet as my land near Britt, that in spite of the very wet season here made over sixty bushels of corn per acre.

You can readily understand why we are not afraid to buy your wet farms. I have had several friends move from here to Northwestern Iowa and buy the most level farm they could and then be compelled to sell it again for the reason that it was too wet for a home and no outlet obtainable for drainage. Make your laws favor the man who wishes to improve your county. I am anxious to pay a ditch assessment on my 800 acres and do not want the State, county or township to drain it for me; just give me a ditch and I will gladly pay the bill; without it my land is worthless. Start fifty dredges next summer and you will start such an army of landseekers from the level prairies of Indiana and Illinois and such a land boom as you have never witnessed in your State. They have quit Iowa until you get better drainage.

If I do not close you will think me a crank on this subject, but drainage has made this county, as well as myself, financially, and I always like to push the good work; that is why I am standing ditch viewer in this county; they know I never reported against a proposed drainage.

After the reading of this letter the meeting adjourned to meet the following morning at 8:30 o'clock in the college chapel.

MORNING SESSION, JANUARY 16, 1904, 8:30 O'CLOCK.

The committee on permanent organization reported Professor W. H. Stevenson for president and Mr. John Hammill for secretary. The report was adopted.

The president-elect made a few remarks in acknowledgment of the honor conferred upon him, and then announced the first number upon the program would be an address upon "Road Drainage," by Senator John T. Brooks, of Hedrick.

A summary of the address follows:

I do not stand before you, gentlemen, claiming any special technical knowledge. That I do not profess, as I am more interested as a learner than as an instructor. I am sure that there will be a number of gentlemen present who will disagree with my views on the drainage question. There may be some who will agree. I wish to warn both classes not to take my views too seriously. Whatever they may be they have come to me through my own experience and observation. I am announced on the program to talk to you on road drainage. I will not treat this question or consider it in itself. I fully agree with Professor Curtiss in his remarks when he joined field drainage and road drainage in one problem.

The problem before us is to get the excess water out of the ground. You can not properly drain the field without benefit to the roads, nor can you properly drain the roads without benefit to the fields nearby. We now confront more closely the problems of field drainage, in view of the fact that the legislature now sitting will beyond question pass a new drainage law. Because of our inability to produce paying crops in many portions of the State without drainage forces, the vital importance of this question is before us, whether we will or not. I know that many members of the legislature are looking to the results of this drainage convention as a very much needed guide for what shall be done in the legislature this winter. A large number, at the time of the passage of the Townsend bill, were seeking not very accurately for information, but when the question was brought before them they sought to know just what was needed. Perhaps any drainage bill is necessarily somewhat voluminous. It seemed to us, at least, those of us located in the more rolling sections, that the Townsend bill was *very* voluminous. A bill that would adequately meet our wants might possibly fail wholly to meet your wants. I spent considerable time for thirty days two years ago on the drainage problem, but I was handicapped at the time as to what you folks required in other parts of the State. We are looking to you to indicate and demonstrate to us what is required in your section.

As to this road problem, *proper*, for I must talk to you a little on that question, it divides itself into two divisions. First, the surface drainage; second, under drainage. Under the old road law, you remember that we worked the roads not because the roads needed it, that is, not *when* they needed it. We did not go out at any particular time because the roads at that time needed our attention, but because the time had arrived when we usually worked out our road tax. When a class of men engaged in any particular line or avocation, have any side task that is imposed upon them, that side task has to abide its time. We worked the roads not when the roads were in best condition to be improved. Consequently, when the roads were seamed and gashed with the wheel tracks, when it needed leveling up, we were often in our fields and the roads waited. When the rain came these seams held the water in the road and forced it into the roadbed. Under the present system one of the fortunate features, as contemplated, is that the roads would receive attention when they needed it, not when it suited the convenience of road laws to work them. In the rolling districts in the southeastern part of the State our roads receive incalculable damage by reason of the water on the hillsides going down the center of the road instead of down the side ditches. There is a little rivulet down the wheel track and on down over the expensive grade. It was left to continue for weeks and months. To my mind a very much more important side of this drainage question is not the surface, however important that may be, but it is the under-drain, the tile drain that takes the water out of the sub-soil. It is simply marvelous to me that there is such wonderful benefit from the underground drainage of highways. You get that surplus water out of the roadbed and it is compact. When the rains cease and the sun and atmosphere dries the surface you have a smooth track to use. Because you have the smooth track, it is leveled up by the next rain. That is to say, you have a very much less part of the water going into the roadbed bed.

I have in mind several stretches of road in my neighborhood that were so bad as to be absolutely impassable in every wet season. For weeks and weeks we would have stretches of road that would be practically impassable. There would be parts of wagons and other vehicles strewn by the side of the road where effort had been made to get heavy loads through. We got our road commissioner to put a stretch of four-inch tile along that road, and it has improved to what is now one of the best roads in that section of the country. It is an elegant roadway. Below the surface a little way in many places we have an impervious clay, that is, so nearly impervious that the water percolates down to that and flows along on it until it comes out on a side hill. It so softens the soil that it will be cut into by the wheels and become miry. In several instances we have put in surface tile, and in every instance they have absolutely wiped the muddy place out of existence and transformed that miry place into one of the best of roads. A rural mail carrier was unable to get through with the mail on the highway, and had to pass through the fields at the side of the road. A few of us appealed to the trustees, and finally we got a line of tile down that road. In two days after that tile was laid the carrier was back on the road. It was one of the finest pieces of road in that section after the tile was placed. What does it do for the fields? I have in mind a field that was situated between my home and one of my own lands. Consequently I passed it almost daily. Two years ago one half of that wet field was tiled. Two lines of four-inch tile were put through one eighty. The east half of the eighty was in corn. The man farming this land started to plow, and when he got out about the center of the eighty he was stopped by the mud. He then planted the east half while waiting for the west half to dry. The corn was eighteen inches high in this part of the field while water would be showing in every furrow and every depression on the west half. Now if it will do that for the field, you will see what it will do for the highway. It will do more for the highway than for the field, because it makes the *surface* suitable for drainage. The tile not only takes care of what water goes into the sub-soil, but it keeps the surface in shape to shed the water off into the side ditches. One of the favorable features of this tiling question is this. In the road question in Iowa, of course we are necessarily cutting and trying. We are yet using the natural surface with but very little change,—simply putting in our culverts and bridges where they are needed. We are facing this road question. You can not make a mistake in tile draining. If you put in your tile right it is money well spent, no matter what you put on after that. No matter what kind of surface you put on if you use macadam, your tile drain is not thrown away. I am firm in the conviction that there is no kind of surface improvement that ought to go on until you have first thoroughly prepared the roadbed by drainage. (Applause.) It is safe, it is necessary and I cherish the suspicion, I may be wrong, but I cherish the suspicion that when you have once thoroughly under-drained your roadbed and kept the roadbed smooth on the surface, possibly you have got pretty near what you want. (Applause.) I do not want to be misunderstood, I do not want to be taking the position that you must stop there or that you want to stop there. I do not want to stand in the way of those who are asking for something farther. The point I made is, this is necessary, this is proper, and, if we find that we can stop there, well and good. There are many other features of this drainage problem that I am interested in. I read not long ago an interesting article from a member of the legislature on the danger that the towns and cities were in, if this problem of drainage were carried out. I find myself differing on one material point in that article. That is in regard to the danger to the cities below. Now at first thought, it would seem to be true that to hurry this water off would increase the danger below, but my investigations have led me to believe that this is not the case. I find by my own experience, in my part of the State, that when the surface soil is thoroughly dried out we can take about four inches of rainfall without even starting our local streams. An inconceivable volume of water, yet we can take it without even starting a local stream. Why? Because we have the capacity to take care of a vast amount of water in our sub-soil. There are ponds, which, of course, hold vast quantities of water, but it is not the first rains that raise the water in our streams. The first rains have doubtless filled up our ponds. I doubt if we are troubled by overflows on the Des Moines and Skunk rivers until after these ponds are filled up. When these surface ponds are all filled and the natural reservoir in the soil itself has all been filled, there is no place left and the waters pile up in the streams and curse us below by destroying our crops and buildings. Your ditches are like a safety valve on a steam boiler. As soon as the pressure gets up to a certain point it blows off. You will find, gentlemen, in these parts of the State, I am sure, that you not only need these surface ditches but you need the tile ditch. Unless you have a very dry season I do not apprehend that you will raise very great crops in those lake beds by doing this. Now, when you have tiled that land you have not only carried this surface water out into the channel of the stream, but you have created a reservoir that will hold any rainy season. We will have more beautiful streams, we will have a clear sparkling stream all through the season where now we only have a stagnant pool part of the time.

I have lived the past two seasons on the Skunk. You have held the water up here to destroy your own crops, and sent it all down held the water up here to destroy your own crops, and sent it all down in one lump to destroy mine after it was half produced. I am afraid, gentlemen, that without pretending any special knowledge I suspect that you are putting too much stress on the open ditch. Now an open ditch is tolerable only when you can not get along without it. I suspect that there are many places where you think an open ditch requisite, where a closed ditch would be sufficient. If you will inform yourself by what others have done. you will be astonished at what a tile ditch can do. Your underground ditch works all the time, getting your water out of the sub-soil below. preparing a natural reservoir for the rain. It is only in exceptional cases that a long ditch is needed for an outlet.

We have on the divide between the Skunk and the Des Moines flat stretches, with here and there a pond. You would be perfectly astonished at what a little tile drain will do for those ponds. I know of plenty of cases where a little four-inch tile run back through the prairie and under that pond made it one of the finest corn fields in the world. I am sure that you men will find this drainage problem easier when you get into it. when you understand what this tile drain will do. While it costs considerable money. yet it is the most profitable money a farmer can spend. I believe that you will be surprised and that you will be pleased with the results this underground tiling will do.

If you are not doing this, I urge on you the very great importance of investigating what this underground drainage will do. and you can put it in. n almost every case. I would simply cut these open ditches to make an outlet. Of course, the outlet becomes important where you bring many of these together and you are back from the stream. Gentlemen, I thank you.

ATTORNEY SAWYER'S ADDRESS.

The convention calling for an opinion from Mr. P. A. Sawyer before opening the business session, he spoke as follows:

"I did not expect to be called upon the carpet, but now that I am here, I will say a few words to you in regard to the workings of the law. The law provides that after things are brought forward like this point, they must be brought before a commission of three. one of which must be an engineer. and they shall classify the lands. The supervisors shall then assess the lands according to the benefit they will receive. Under this provision a ditch may be established upon a petition signed by a majority of the abutting land owners. The Twenty-first General Assembly passed another act providing for the inauguration of proceedings by a vote of one hundred of the voters of the county. The abutting owners must specify just the ditch they want and pray for. the route and the terminus. The engineer in this case is not appointed to go on and lay out the ditch, saying where it shall go and where it will do the most good, but his latitude is taken away from him and he simply looks after the hygiene of the ditch after it is planned. Many people are taxed but have no notice, that is, any positive notice that the ditch was going through their lands, and I believe they are entitled to positive notice.

"Now if you draw up a new law and go down to Des Moines and offer it to the legislature, it will have to go through committees, and it will be taken up section by section and discussed; committee work is very slow, and before that act is reported to the legislature you have a large calendar. A new law would mean that we would get no help this year. Amend this law, just as briefly as you can, for the purpose of bringing remedies that the law now needs. Our laws in regard to drainage are just as good as the majority of States, and they are all right as far a they go. I think the best plan would be to amend the law, first, require that the engineer when he makes his report be more specific and return a report of the land that, in his opinion, would be affected, and describe accurately each tract of land and give the name of the owners. Before this is established, the supervisors should be notified. Then, when the petition comes for the hearing, the supervisors should notify those people to come forward and show just cause why their land should not be included in the drainage. Then let the supervisors go ahead and classify the land such as low, wet, dry, swampy, etc., and also return specifically, along with the description of the land, the names of the owners. I would make the ditch tax a first lien on the land, and then, if several persons want to go ahead and make an improvement of this kind, they can do it. You know it is universal in this world that if there is work to be done the large crowd are willing to sit back and let those few go ahead that are willing to do it.

"In regard to the amendment of the law, I would get at it just as quickly as you can, so that the improvements now under the process of being carried forward will not necessarily be delayed, because very soon it will be time for your drainage boats to go to work."

It was now moved, seconded and carried, that Mr. P. A. Sawyer, Mr. C. G. Elliott, Prof. C. F. Curtiss, and two other gentlemen that the chair shall name, be appointed as a committee to draft an amendment to the Iowa drainage laws, and use their influence to secure legislative action at the present session of the general assembly.

The committee on resolutions gave the convention the following report:

RESOLUTIONS.

Whereas, the excessive rainfall of the last two years has caused untold damage to the agricultural interest of Iowa, and brought about a general realization of our imperfect drainage system, and a full realization of the needs of our own State in this regard, and,

Whereas, the recent decision of the supreme court has demonstrated the necessity of an immediate amendment of our drainage laws, therefore, be it

Resolved, That the disasters from the rains and floods of the past two years will not be entirely without advantage if we profit by the experience and at once take vigorous and intelligent action in relation to our drainage interests.

Resolved, That we are more than gratified at the success of this convention, and the thanks of the farmers are due the authorities of the Agricultural College who conceived the idea and who have so successfully carried it out;

Resolved, That we earnestly favor the taking of immediate action in the way of presenting to the legislature such amendments of our present drainage laws as shall remedy any defects therein and make them at the same time practical, efficient and constitutional;

Resolved, That we endorse and commend the work of the office of experiment stations of the Department of Agriculture, in promoting the drainage of farm lands by furnishing advice upon intricate problems which often confront us, and by preparing and disseminating the results of drainage investigations, and ask that this work be enlarged and extended;

Resolved, That we appreciate and heartily endorse the work now being done by the Iowa State College and the State Experiment Station for the advancement of agricultural knowledge along practical lines.

W. S. KELLEY, Harrison county, Iowa,
H. HINMAN, Wright county, Iowa,
C. G. ELLIOTT, Washington, D. C.,
Committee.

The report of the committee was unanimously adopted and a vote of thanks extended to the faculty of the Iowa State College and the people of Ames for courtesies extended during the convention.

Chairman Stevenson was empowered by the convention to appoint an executive committee. He appointed the following named persons on this committee: Mr. Clarence Baker, Appanoose county; Mr. J. T. Brooks, Hedrick, Iowa; Mr. G. D. McNabb, Garner, Iowa.

ORGANIZATION OF THE IOWA STATE DRAINAGE ASSOCIATION.

A motion was now made, seconded and carried, that this convention form a permanent organization that shall be known as the Iowa State Drainage Association.

Prof. D. A. Kent of Jewel Junction was elected president of the new drainage association; Prof. W. H. Stevenson, department of soils, Iowa State College, was made secretary and treasurer and the officers were empowered to appoint one vice president from each county in the State.

By motion the membership fee was fixed at one dollar.

The convention adjourned to meet at 1:30 P.M. in the College Chapel.

AFTERNOON SESSION, JANUARY 16TH, 1:30 P.M.

At the opening of the afternoon session Mr. E. B. Howard of Ames, Iowa, addressed the convention upon the subject, "Where Will the Drainage Water Go? What Damage Will it Do?" He spoke as follows:

"The water discharged from ten or one hundred tile lines, or one or ten large drainage ditches, you all agree will drain the surface water many times faster than Nature would do it. Nature held it in mossy sloughs and ponds until a large portion of it was absorbed by the heated atmosphere of dry summers.

"Only a few days ago Representative Chassell was reported in the Des Moines press as saying, we would now have more frequent overflows because of the tile lines already laid. Then how much more if all the new ones you predict?

"It is obvious that villages, towns and cities partly built on overflow lands will partially be inundated by spring freshets or heavy or continued summer rains.

"Des Moines and other cities and towns are now discussing heavy taxes and long and high levees to withstand the sudden and mighty rush of waters.

"The farmers owning bottom land in Iowa will send up a voice as of thunder, when they see the damage to their grain fields and meadow lands.

"I write this paper because I have had many years of experience in partially or wholly getting this great rush of water off the bottom lands in the quickest and cheapest manner. The quicker and more economical because I cut a very narrow, though very deep ditch on my survey line and give it from one to three years to cut itself into a deep and broad enough channel to carry a much greater quantity of water, while the velocity of the new and straight stream is many times that of the old and crooked ones, which are not only retarded by tree roots, brush and log impediments, but many times more by undermining the banks of the old and crooked stream bed and thereby forming eddies or whirl pools, which so greatly retard the velocity of the stream as to seemingly bring it almost to a standstill.

"The straightening of crooked stream beds, noticing the gain of water discharged per second, is not a theory. I have practical knowledge of what I write. I own a large farm in Marshall county, Iowa, or more properly speaking several small farms of two hundred to three hundred acres each, extending from the steep to gently sloping creek and river hills into the higher and lower bottom lands of two creeks and Iowa rivers.

"The smaller creek, named Mud creek, coursed its very crooked bed for over three quarters of a mile through one farm, and discharged itself into the higher Honey creek. I surveyed a straight line, from the point where Mud creek entered my farm, on through its low lands to the shortest and best point of discharge into Honey creek; by simply cutting a ditch on this surveyed line, only the size of the smallest tile ditch and from one to six feet deep; in a single year the water cut this little narrow ditch larger than its original stream bed, although this new creek channel discharged itself forty rods up stream on Honey creek from the point of its old or natural discharge, by cutting its new channel straight. It was but one fourth of a mile in length, as compared with the old and crooked channel of three fourths of a mile. Being so much shorter it had over double the fall. When the new and straight channel was filled full of water, its increased fall made its velocity so fearful, that no drift could obstruct its current. Thus when its stream bed was bank full its discharge per second was several times that of the old crooked stream bed at its full capacity.

"So successful and cheap was this experiment with Mud creek bed which was three or four feet at bottom and ten to twelve feet at top and three to four feet deep that I set to work to make big and crooked Honey creek straight, the stream bed of which was ten to twenty feet at bottom and thirty to fifty feet at top and five to ten feet deep. Of course both natural stream beds are nearly double the width named. at sharp curvatures, and double the depth named, at their narrowest banks.

"In carting the dirt from the newly surveyed channel of Honey creek and depositing it in the old creek channel for a dam. I made my first failure by making the dam too near the head of the new narrow ditch. When this narrow ditch washed itself into a channel, fifteen or thirty feet wide, which it did in about two years' time, it washed away the end of the dam next to the new channel.

"I should remark that the head of the new channel as well as the dam should, if possible. be made on the lowest bottom lands so that a common overflow will pass around in place of over the new dam.

It is needless to say that the discharge of Honey creek waters being many times the quantity of Mud creek. the straight and narrow ditch was faster cut in Honey creek by the greater flow of water. save that the new channel for Honey creek was not cut on an entirely straight line. It was made somewhat crooked so as to go through the low lands and thereby save labor, and the more, to save cutting deep into the middle of a fine large second bottom cornfield.

Now the new, deep and comparatively straight channel of Honey creek passes but a mile through two of my farms from the head of its new channel to its point of discharge into Iowa river as compared to over three miles of its old and crooked channel.

This comparatively inexpensive cutting of new and straight channels has made my long. high and very expensive levee. which was made many years ago, useless, save in times of very high water marks.

Iowa river borders my land for a distance of two or three miles. Two enterprising and adjoining land-owning farmers are now ready to co-operate with me in the like making of a channel of Iowa river straight for a distance of five to six miles.

We most respectfully ask this drainage convention to co-operate with owners of bottom lands in Iowa, that by either State or county aid. we may be enabled to make our crooked and very sluggish streams straight. that such streams may be made so much shorter with so much greater fall. and straight. thus giving them such tremendous velocity that your sudden and mighty rush of waters from your thousand new lines of tile and artificial drainage waters may be quickly sped to the Missouri and Mississippi rivers without damage to villages. towns and cities on Iowa bottom lands and without damage to owners of bottom farm lands in Iowa.

After some discussion Mr. E. B. Howard presented the following resolution, asking that it might be referred to the executive committee.

Resolved, by the delegates of the State Drainage Convention, assembled at Ames. Iowa. January 16, 1904. that courts and juries at a distance can not understand the situation of the drainage area. or tax levies under dispute like competent engineers who can personally investigate the matters in dispute. Therefore, be it

Resolved, That a board of three engineers for each District Court district be appointed by the State drainage engineer commission to hear complaints and render decisions, or make awards, in case of appeal from the county commission. Awards from this district commission may be appealed to the State drainage engineer commission. Action before all courts to be barred until it passes through these two engineer arbitration boards.

Upon motion, Mr. Howard's resolution was referred to the committee appointed to secure the passage of a drainage bill.

The chair was now authorized to appoint a committee of three to draft constitution and by-laws for the Drainage Association.

Chairman Stevenson appointed on this committee: John Drug, Stratford; J. F. Ford, Fort Dodge; G. D. McNabb, Garner.

On motion, the vice presidents of the Drainage Association were empowered to secure members, collect from each member a fee of one dollar, and forward the same to the treasurer.

Prof. C. J. Zintheo, of Iowa State College, said: "It seems to me that we have a great deal of valuable information in these three sessions. I think that the matter ought to be in such shape that anyone who reads may see what we have done.

"I move that the proceedings of this convention be put in published form."

The motion was carried.

Mr. J. Z. Adams remarked: "We must not adjourn and leave here until we make some provision, until we have a fund to have these proceedings published."

A committee was appointed by the chairman to pass through the audience and collect a membership fee of each one who desired to become a member of the association.

After a general discussion of much interest reviewing the work of the three sessions of the convention and emphasizing the necessity of drainage legislation at the present session of the general assembly of Iowa, the convention adjourned to meet at such time and place as the newly elected president and secretary of the Iowa State Drainage Association shall name.

I. PIG FEEDING.

PROFITABLE PIG FEEDING.

Col. G. W. Waters, Canton, Mo.

In Bulletin No. 12, Missouri State Board of Agriculture.

The pig makes by far the greatest amount of gain for the food consumed of all of our meat producing animals. Doctor Warrington in "Chemistry of the Farm" states that for each one hundred pounds of feed consumed the gains are: "Cattle nine pounds, sheep eleven pounds, pigs twenty-three pounds," or pigs make nearly two and a half times as much gain from a given amount of feed as do cattle. But to state the matter more concisely, analyses show upon the average that for every one hundred pounds of the digested nutrients consumed cattle gain twelve and seven tenths pounds, sheep fourteen and three tenths pounds, and pigs twenty-nine and two tenths pounds. It may be suggested here that when prices are anything like the same it is a vastly more profitable use of feed to produce pork than beef. But of course there is a place for cattle as there are many varieties of feeds suited for cattle that pigs cannot use.

It is worthy of thought, however, to try to broaden the uses of our feeds for pigs, for they will use profitably many of our feeds that we do not think of, as we shall see as we proceed. By properly preparing them there are many of our coarser feeds that may be fed to pigs, and in this way not only secure an increased amount of grain but at the same time the pigs will have a greater variety of feeds, thus securing better health and thrift. Lest some of you should doubt the accuracy of Dr. Warrington's statements as to the comparative gains made by cattle and hogs from a given amount of feed, I call your attention to the following tables:

COST OF GAIN IN HOGS AND CATTLE COMPARED.

TABLE 1—PIGS—COST OF GAIN—RATE OF GAIN—NUMEROUS STATIONS.

Number of Stations Reporting.	Whole number fed at all stations.	Average weight of pigs, pounds.	Feed given daily, pounds.	Gain per day, pounds.	Feed required for 100 pounds gain.	Gain per bushel, pounds,
Forty-one	174	38	2.23	.76	293	19.0
One hundred	417	78	3.35	.88	400	14.0
One hundred nineteen	495	128	4.79	1.10	437	13.0
One hundred seven	489	174	5.91	1.24	482	11.6
Seventy-two	200	226	6.57	1.33	498	11.4
Forty-six	223	271	7.40	1.46	511	10.1
Nineteen	105	320	7.50	1.40	537	10.0

TABLE 2–CATTLE–COST OF GAIN COMPARED WITH PIGS.

Station.	Kind of Cattle.	Average age at beginning.	Average weight at beginning.	Days fed.	Feed for 100 lbs. Gain. Hay, pounds.	Feed for 100 lbs. Gain. Corn, Pounds.
Kansas	126 heifer calves	7 months	408	210	508, alfafa	503
Kansas	4 steers.......	26 months	900	56	Alfalfa daily	730
Kansas	4 steers, same lot.	26 months	900	140	Alfalfa daily	910
Kansas	4 steers, same lot.	26 months	900	182	Alfalfa daily	1,000
Missouri.....	4 steers, yearlings ...	20 months	813	80	1,420, timothy ...	605
Missouri	4 steers, yearlings ...	20 months	900	80	909, clover	300
Missouri	4 two-year-old steers	31 months	1,150	119	470, timothy	1,140
Missouri.....	4 two-year-old steers	31 months	1,177	119	220, cow pea hay.	837

In Table I the fact that gains are uniformly made for less expenditure on young animals than on older and larger ones is clearly shown. A great many experiment stations have tested this matter, and in the table is shown that pigs weighing twenty-five to fifty pounds make a gain of one hundred pounds for a little over one half the amount of grain required to make the same gains on pigs weighing three hundred pounds and over. The same principle holds good in cattle feeding. Referring to Table II, you notice the cheapest gains are on calves and the most expensive on the large steers. But the purpose of introducing the table on cattle feeding is to make the comparison of cost of putting on gain as between cattle and pigs. The cheapest gain made on pigs, average of 41 trials of different stations, averages two hundred and ninety-three pounds of grain, not necessarily corn in every case, but as a rule a balanced ration was fed. Compare this with some of the cheapest gains made by cattle. In the case of the calves reported by the Kansas station it is claimed to be the cheapest production of baby beef on record, yet it took five hundred and three pounds of corn plus five hundred and eight pounds of alfalfa hay to produce one hundred pounds of gain, amounting to at least the equivalent of seven hundred and fifty pounds of grain such as was fed to the pigs. Look through the tables and you will find the general testimony verifies the statement as to the productive uses the pig makes of his feed. Take the highest requirement for the pig at the weight of three hundred and twenty pounds, viz. five hundred and thirty-seven pounds; compare with the requirement of the large beef steer, viz. one thousand one hundred and forty pounds of grain plus four hundred and seventy pounds of timothy hay, equal to a total of at least one thousand three hundred pounds of grain, such as was given to the pig to produce one hundred pounds of gain.

CHEAPENING PORK PRODUCTION.

But the main problem that confronts us now is how may we cheapen production of pork? Or in other words, and more directly stated, how may we make the feeds we give our pigs more efficient? More productive? As between some methods of feeding and management and other methods there is a difference of ten, twenty or even fifty per cent in the yield. If by judicious feeding we could increase the efficiency of our feeds by ten per cent, it would mean a vastly increased output from a given crop. Secretary Ellis, from reliable sources, estimates the yield of our corn, hay, fodders and all feed crops in the State in 1902 at the vast sum of $200,000,000. Two thirds of this ought to go into live stock. A ten per cent increase in the efficiency of this feed would mean $13,000,000 more to the farmers.

It is our purpose to discuss some of the conditions under which our feeds may be more efficiently used in the production of pork.

GIVE A VARIETY OF FEEDS.

Pigs do better on a variety of feeds than on any single feed. This is a principle of universal application in all classes of stock feeding. This proposition is well understood by the farmers, but still it is ignored so completely that we think it well to give it some emphasis. Just how much better the pig will do if fed a variety, we will let the pig himself testify, for whatever other mean thing a pig may do, he will not tell a lie. The following are some of the results. Many other tests have been made, all pointing to results much the same.

TABLE 3—SINGLE FOOD VS. VARIETY—WISCONSIN STATION—FIVE LOTS, FOUR IN EACH LOT.

Lot.	Kind of Feed.	Amount Required for 100 Pounds Gain.
I	Corn alone, required for 100 pounds gain	537 pounds
II	Middlings alone, required for 100 pounds gain	522 pounds
III	One-half corn and one half middlings	439 pounds
IV	One-half corn and one half oats	429 pounds
V	Corn plus clover hay	422 pounds

It will be observed that by combining shorts and corn half and half there was a saving of nearly one hundred pounds of the mixture in producing one hundred pounds of gain. By the use of one half oats and one half corn more than one hundred pounds was saved. By the use of a little clover hay, over two bushels of corn was saved in producing one hundred pounds of gain. At that rate clover hay would take the place of five bushels of corn in bringing a hog up to two hundred and fifty pounds, marketable size. How is the clover hay fed? Better probably to chaff it in cutting box, dampen it or steam it, but it may be fed dry in racks. The Montana Experiment Station found that alfalfa fed in racks, and corn, gave better results than alfalfa cut and wetted and meal added. The Nevada Station found results in feeding three lots of pigs, carefully selected for uniformity, four in each lot on alfalfa hay and other combinations as follows:

Lot.	Pigs.	Weight, Pounds.	Days Fed.	Kind of Feed.	Average Gain or Loss.
I	4	131 to 150	21	Alfalfa hay	Loss, 4.5 pounds
II	4	130 to 149	21	Alfalfa and turnips	Gain, 1.7 pounds
III	4	132 to 147	21	Alfalfa, cowpeas, turnips	Gain, 22 pounds

While hay alone was fed at a loss of four and a half pounds in twenty-one days, turnips and alfalfa made a slight gain, but when the ration was made richer and of great variety the gain was over one pound per day for each pig.

Every experiment and all the experiences of farmers attest the value of a variety of feeds, still a large per cent of farmers make no sort of effort to provide such variety. When it is remembered that in many cases the variety may be supplied by utilizing feed stuffs that hogs do not ordinarily eat and which are of comparatively little value, the importance of the proposition becomes doubly valuable. For instance, corn stalks cut at proper stage made into ensilage may be used by pigs with wonderful benefit.

VALUE OF PASTURE FOR PIGS.

We will now state two propositions bearing on economy of production, first, while the pig is not considered primarily a grazier animal, from the fact that he can not be expected to make gains and grow fat if turned onto common pasture grass like cattle, sheep or mules, yet as a matter of fact the pig will make better returns for the amount of grass eaten than any other farm animal. Moreover, the pasture will increase the efficiency and value of the grain fed in connection with it. The second proposition is this: the pig is a gross feeder and will eat too much of rich feeds, as grain, more than he can use economically, more than he can digest well, consequently greater gains from a given amount of corn are obtained if the pig is fed less than he can or will eat. This statement applies with special force in cases of a long feeding period. The two propositions just announced are brought out in the following table.

TABLE 4—VALUE OF PASTURE—FULL FEED VS. PARTIAL FEED—WISCONSIN EXPERIMENT.

Lot.	How Fed.	Gain per day, pounds.	Corn for 100 pounds gain
I	Full feed, dry lot	1.15	537 pounds
II	Full feed, clover pasture	1.30	417 pounds
III	Three fourths full, clover pasture	1.20	377 pounds
IV	One half full, clover pasture	.87	352 pounds
V	One fourth full, clover pasture	.64	243 pounds
VI	No grain, clover pasture	.36	

In the case of lot I fed full in dry lot, five hundred and thirty-seven pounds of corn was required for one hundred pounds of gain. In lot II full fed and having run of clover field there is a sudden drop in the amount required. But when we take advantage of the second proposition also and reduce the corn to three fourths full feed, as in lot three, we have a still larger drop, or stated more directly, the increased efficiency of the corn given is marked. Nearly three bushels less of corn to produce one hundred pounds of gain as compared with dry lot feeding. For growing hogs a still greater reduction of corn is advisable. The rate of gain is slower but it is vastly cheaper. I have gathered a score or more of instances of farmers testing this. I myself have had quite a number of experiences proving the double value of pasture and limited feeding in the economic production of pork. I may say, however, that it is probably wise farm practice to feed full for the last thirty days before marketing. Pigs may be brought on to weigh one hundred and twenty-five to one hundred and fifty pounds at the rate of eighteen to twenty pounds of gain from a bushel of corn.

But we do not always have clover or alfalfa pasture for hogs. It is of interest to inquire in how far other pastures will take the place. I call your attention to the Illinois experiment as follows:

TABLE 5—BLUE GRASS PASTURE—TWELVE WEEKS IN TWO PERIODS—FOUR TRIALS—FOUR HOGS IN EACH LOT—ILLINOIS EXPERIMENT.

Lot.	First Eight Weeks.	Corn required, pounds.	Next Four Weeks.	Corn required, pounds.	Average.
I	One half full fed	443	Full fed	448	440
II	Full fed	465	Full fed	549	507
III	Dry lot, full fed	532	Dry lot, full fed	725	629

TABLE 6—RAPE AS PASTURE, TWO SEPARATE TRIALS.

Lots I and III fed on a ration of two parts corn and one part shorts and had run of rape patches. Lots II and IV fed on same rations without rape.

Lot.	Pigs.	Rape.	Days fed.	On Full Feed.	Required for 100 pounds' gain, pounds
I	10	.36 acre	76	One part shorts, two parts corn	243
II	10	Dry lot	76	One part shorts, two parts corn	376
III	19	.6 acre	42	One part shorts, two parts corn	512
IV	19	Dry lot	42	One part shorts, two parts corn	433

The value of rape as a summer feed is unquestioned. Old feed lots. instead of being allowed to produce luxuriant crops of jimson and burdock can be planted to rape. I have seen many such instances verifying the foregoing table. Make the calculation and you will discover that the actual productive value of the rape in this case was equivalent to 46.4 bushels of corn to the acre. Just as good results are had from rye pasture for fall and early spring. Then might come early sown oats. then sorghum, then rape, then cow peas, making a continuous succulent pasture practically the year round. While farm animals do better when they have the run of a pasture than if the same growth of the pasture is cut off and fed to them is insoiling, yet the same yield will go four times as far when soiled. The time comes on when land will be so high that it will not be economy to turn stock onto the crops to trample them down and get only one fourth of their actual value. The pigs will do quite well on soiled crops. But the best plan, probably, would be to put the crops into the silo. Mr. E. N. Cobb of Monmouth, Illinois, feeds his hogs for fattening a combined ration of silage and ear corn to great advantage. He feeds his brood sows on a ration of ten pounds corn silage and two pounds of oats daily. They do splendidly on it, and it makes a cheap ration. Clover in season, sweet corn, rape, etc., may be cut and fed to the pigs with profit.

There are a number of other problems that come up for solution. One would be the benefit of grinding. I discuss grinding feed more fully later on. Soaking and wetting feed has a value sometimes. But cooking feed has not shown good results. In fact with some twenty experiment station tests it has turned out that cooked feed does not produce as great gains as raw. It seems natural for a pig to eat his food raw. It will take a long time to educate him up to such a degree of refinement as for him to require cooked feed. A daily ration of slops, however, is of great value, but it should not be given as an exclusive diet.

BALANCE THE CORN.

As we are in the center of the great American corn belt and as corn is much the cheapest feed we can raise, much the most convenient feed, the endeavor should be to so use the corn as to get the greatest possible value out of it. But corn will not do its best if fed alone, and as a single feed. It is exceedingly rich in oil and carbohydrates, the great fat-producing properties. If it has a weak place it is in the muscle-producing property—the protein. The thing to do is to strengthen the weak element in the corn by combining some feed strong at the point where corn is weak. This may be done by combining with it clover cow peas, alfalfa, bran, oats or ship stuff. Bran, however, is an expensive feed for hogs and is better suited for ruminants—cattle—sheep. There is so much crude fibre in bran that pigs do not get all the nutrient out of it like cows do.

It is scarcely necessary to call your attention to the necessity for an abundance of ash or mineral matter in our feeds for pigs. Corn is weak in mineral matter that goes to make up the bone. It is so easily supplied, however, in the form of wood ashes that is no disparagement to the corn. The prudent farmer will supply his hogs with plenty of wood ashes and salt.

As to condimental food, so-called "stock food," it is far better to feed your pigs on diversified feeds, give them healthful environment so that through healthy nutrition nature may produce thrift which is better than to feed improperly and depend on condiments. Balancing the ration will be of infinitely more value than dosing with medicine.

LONG FEEDS MAKE SLOW GAINS.

It is a common observation that pigs full fed for a considerable length of time make smaller gains. This is true with nearly all classes of stock. The following table bears on that point:

TABLE 7—LENGTH OF FEEDING PERIODS ON FULL FEED, TWELVE WEEKS.

Months.	Weight at beginning.	Weight at end.	Corn required for 100 pounds gain.
First month	222 pounds.	270 pounds..	418 pounds
Second month	270 pounds..	313 pounds..	461 pounds
Third month	313 pounds..	340 pounds..	559 pounds

GRINDING GRAIN.

Considerable work has ben done on this subject by the Missouri, Kentucky, Ohio and Wisconsin Stations. While the result shows that on the average, grain when ground will produce a somewhat larger gain than when fed whole, yet the difference is so small that unless the grain is high priced it will not under ordinary circumstances defray the expense of grinding. For example, averaging all of these results on corn, it has been found that a hundred pounds of gain required:

Whole corn	521 pounds
Ground corn	495 pounds

Difference in favor of grinding, twenty-six pounds or 5 per cent.

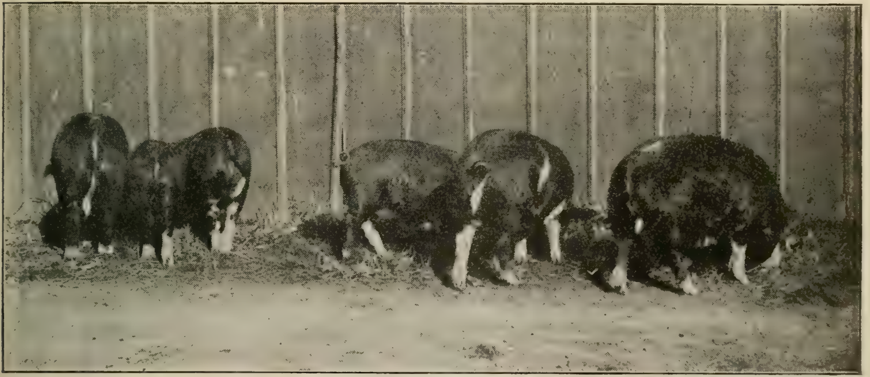
This means that with corn at forty cents a bushel, a saving of 5 per cent would amount to about two cents a bushel, which would scarcely bear the expense of grinding under ordinary circumstances.

These experiments were conducted chiefly with hogs that were old enough to do their own grinding. The results, therefore, do not apply with the same force to pigs that are just being weaned. This is a critical time in the life of a pig, and it will pay to grind the feed if even for a short time, or until they get well started. At this time it is especially important also to supply them with something besides corn. If oats are cheap, or wheat that will not grade on account of having been wet or for some similar reason can be procured at about the price of corn, it will pay to mix equal parts wheat and corn, or two thirds corn and one third oats, and grind the whole together and feed it in a stiff dough but perfectly sweet. Under no circumstances should the grain be allowed to sour, nor should it be fed in a thin slop so as to tempt the pig to gulp it down without masticating it and mixing with it the proper amount of saliva. Scours, indigestion and improper assimilation follow in the wake of feeding the foods in a sloppy condition.

Again, it sometimes happens in the case of older hogs that have been fed for a long time on an exclusive corn ration, that they cease to thrive, and this difficulty may sometimes be partly remedied by grinding or soaking the feed, and oftentimes by cooking, but a much more effective remedy will be to give them a limited amount of ship stuff with the corn in winter; and in summer, by allowing them the run of a good clover, cowpea or Soy bean pasture. When hogs with plenty of corn are free from any specific disease, and yet cease to thrive, it is certain that they need a greater variety of feed. A limited quantity of artichokes or cull potatoes boiled will be very helpful at this point. Nothing is as good at this time as skim milk fed sweet.

THE VALUE OF DIFFERENT KINDS OF PASTURE.

The Missouri Experiment Station has just completed a very interesting experiment, in which bluegrass, red clover, alfalfa and rape pastures were compared. It is to be borne in mind that clover and alfalfa supplied more protein than either bluegrass or rape, and that they therefore balanced the corn which the hogs had in addition to the green feed, more effectively than either rape or bluegrass. These results are better shown by the half-tones made from photographs of each lot of hogs with the feed consumed and cost of gains shown under each lot.



LOT 5. CORN AND BLUEGRASS—SIX PIGS.

Weight at beginning of experiment 271 pounds.
Weight at close of experiment 656 pounds.
Total gain in ninety days 385 pounds.
Average daily gain per pig .71 pounds.
Grain required per pound of gain, 5.2 pounds.

Cost Per Hundred Pounds of Gain—Corn 40 cents per bushel, green bluegrass $3 per ton—$3.92.

LOT 4. CORN AND GREEN CLOVER—SIX PIGS.

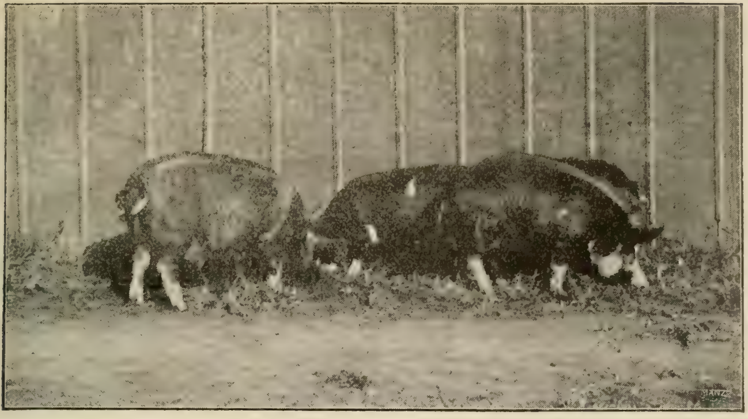
Weight at beginning of experiment 295 pounds.
Weight at close of experiment 767 pounds.
Total gain in ninety days 472 pounds.
Average daily gain per pig .87 pounds.
Grain required per hundred pounds of gain 4.29 pounds.

Cost Per Hundred Pounds of Gain—Corn 40 cents per bushel, green clover at $3 per ton—$3.20.

LOT 3. CORN AND GREEN ALFALFA—SIX PIGS.

Weight at beginning of experiment 283 pounds.
Weight at close of experiment 793 pounds.
Total gain in ninety days 510 pounds.
Average daily gain per pig .95 pounds.
Grain required per pound of gain 3.97 pounds.

Cost Per Hundred Pounds of Gain—Corn at 40 cents per bushel, green alfalfa at $3 per ton—$2.96.



LOT 2. CORN MEAL AND RAPE—SIX PIGS.

Weight at beginning of experiment 284 pounds.
Weight at close of experiment 705 pounds.
Total gain 421 pounds.
Average daily gain per pig .78 pounds.
Gain required per hundred pounds of gain 4.82 pounds.

Cost Per Hundred Pounds of Gain—Corn at 40 cents per bushel, green rape at $3 per ton—$3.49.

Lot 6. Corn and Skim Milk—six pigs.

Weight at beginning of experiment 287 pounds.
Weight at close of experiment 1,269 pounds.
Total gain 981 pounds.
Average daily gain per pig 1.81 pounds.
Grain required per pound of gain 2.44 pounds.

Cost Per Hundred Pounds of Gain—Corn at 40 cents per bushel, skim milk at 15 cents per hundred—$2.84.

It will be noted that the cost per hundred pounds of gain of the lots fed in different ways was as follows:

Corn and bluegrass	$3.92
Corn and rape	3.49
Corn and clover	3.20
Corn and alfalfa	2.96
Corn and skim milk	2.84

These results therefore emphasize strongly what has already been said with reference to the value of balancing the corn ration. The three balancing foods used in this experiment were clover, alfalfa and skim milk, and it will be noted that in every case not only cheaper gains were made with these materials combined with corn, but that the hogs made more rapid gains.

In this experiment by using clover instead of bluegrass, a difference of almost seventy-five cents a hundred in the cost of gain was effected. When alfalfa was used instead of bluegrass, a saving in the cost of pork was almost a dollar a hundred or was made almost one third cheaper. When skim milk was used, more than a dollar a hundred in the cost of production was saved. When we consider that clover will yield more than bluegrass, it is perfectly obvious that we can make much more pork per acre by providing them with clover pasture instead of requiring them to run on bluegrass. Unfortunately some of our farmers require their pigs to graze on timothy, which is not as good as bluegrass even. I do not take the position that bluegrass is not a good pasture, even for hogs—on the contrary it is the best grass for this purpose we have—but the clovers are far superior to any grass for this purpose, both in point of yield and in feeding value.

The high feeding value of rape as compared with bluegrass is of interest to every hog grower. It will be noted that the cost of gain where rape was used was about forty-five cents per hundred less than where bluegrass was used. As has already been pointed out, rape is one of the most productive green forage crops we have and may be grown at comparatively little expense and is practically a certain crop and must in the light of these experiments prove highly profitable to the hog raiser. Abundant experience shows that rape has even a higher value for sheep than for hogs.

A SUCCESSION OF PASTURE FOR HOGS.

It is not safe or even desirable to rely upon a single crop to furnish pasture for our hogs throughout the entire season. It is better to arrange for a succession of pastures from the beginning of the season until the hogs are ready for market, making the feed richer and more concentrated toward the close of the season and as we approach the finishing of fattening period. For this purpose the following crops are recommended:

Red clover or alfalfa.
Rape.
Cowpeas.
Soy beans.

RED CLOVER OR ALFALFA.

On lands adapted to alfalfa it will undoubtedly prove to be better for hogs than red clover, inasmuch as it will produce a larger quantity of feed of a somewhat higher value. Inasmuch as we have not yet learned to grow alfalfa sucessfully on the majority of our upland clay soils, we shall be forced to rely chiefly upon clover. It starts earlier in the spring than any hog pasture we have excepting alfalfa, and would therefore be used first, and should be used as long as it is succulent and palatable. Usually not later than the middle of June the crop will have become so mature that the hogs will relish a change for the time being, and the surplus clover should be cut and removed so as to allow the second or fall crop to start promptly.

RAPE.

This crop should be sown as early in the spring as the ground will work. The richer the land the better. An old feed lot, or land that has been heavily manured should be selected and broken in the fall if possible, so that only the surface will need to be worked in the spring. Sow in rows about thirty to thirty-six inches apart, using about three pounds of seed per acre, and cultivate level and shallow once or twice, or as often as is necessary to keep the weeds down. Each time the rape is eaten down it should be given a cultivation to facilitate its starting into growth again. By sowing broadcast the rape will not produce anything like as much as when grown in rows but will be somewhat more palatable. At the Experiment Station almost twice as large a yield has been uniformly obtained from growing it in rows than from broadcasting. If sown broadcast, about five pounds of seed are required per acre, covered with a smoothing harrow. One of the secrets of success in growing rape in this climate is to get the seed in early. A frost or even a light freeze when the young plants are coming up will not hurt them. By the middle of May the rape is large enough to turn on, and it may be pastured at any time after that. If the green lice or cabbage worms attack the rape in any considerable quantities, it is essential to pasture it hard at once to prevent their destroying the crop. Severe pasturing is a complete remedy for these insects. By the time the clover has been pastured down the rape will be ready for the hogs.

It should be borne in mind that in changing from clover to rape we are changing to a less nutritious food, as shown by the experiments already referred to and it will be necessary to increase somewhat at this point the amount of corn the hogs are getting.

It is well to emphasize the fact in passing that it will pay to give the hogs some corn throughout the season no matter what sort of pasture is provided as nothing has been more clearly demonstrated than that the great profit in hog production lies in keeping them growing rapidly and in finishing them off young.

In the ordinary season a large area of rape will not be required. Two acres will carry thirty one hundred pound hogs for a month or six weeks in the first crop and will in seasonable weather recuperate in less than a month so that they may be turned on again. Usually in this climate we eat rape down three or four times during the season.

COWPEAS.

To provide a crop of cowpeas in the best condition for hogs by the time the rape ought to be eaten down it will be necessary to select some very early maturing sort and sow rather earlier than is advised for a general crop. For this purpose I would recommend the New Era, Sherman's Northern Prolific or Warren's Extra Early to be sown about the middle of corn planting time in rows about thirty inches apart and cultivated shallow and level as often as is necessary to hold the weeds in check. For the best results the hogs should not be turned on the peas until the first pods are turning yellow. They will, however, make good pasture before this time, and if the hogs are needing pasture I would not advise waiting until they reach that stage of maturity. A larger area of cowpeas for hog pasture should be sown about the end of corn planting time and for this purpose I would recommend the whippoorwill or black variety. These may be sown broadcast and covered with a spring toothed harrow or what is better, sown with a grain drill letting all hoes run, using from a bushel to a bushel and a half of seed per acre. They will require no subsequent cultivation and will come on about the time the earlier varieties mentioned have been eaten down.

Soy Beans.

As a grain crop to use in connection with corn for fitting the spring crop of pigs for the market, the Soy bean is a very valuable crop. It is essentially a grain plant, very rich in protein and while the hogs are running on Soy beans they should have access to corn to balance the ration. While the corn does not contain enough protein for the best results, Soy beans contain more protein than is profitable to feed, and the combination of the two grains is therefore much better. The Soy bean matures about the same time as a medium early corn, like the Leaming, and the two crops could be grown in the same field so that the hogs could have access to both without further labor. If this is not feasible, the corn should be thrown to the hogs every day. I would advise the use of the early yellow variety sown in drills about thirty to forty inches apart, using about three pecks to the acre and cultivate shallow until the plants completely shadow the ground. The hogs should be turned in when the first pods begin to ripen.

While I consider the Soy beans somewhat better for finishing a bunch of hogs than the cowpeas, at the same time if one does not care to bother with so many different crops, the cowpea may be used instead with satisfactory results.

For brood sows in winter and very early spring, it is always advisable to give them access to a piece of early sown wheat or rye, and to let them have a limited amount of nicely cured clover, alfalfa or cowpea hay by way of variety of feed. Sorghum stalks grown as is customary for the production of syrup, in limited quantity, make an excellent addition to the ration. The main thing to be avoided in carrying hogs of this sort through the winter, is a straight corn diet. The greater the variety of cheap materials like these, the better the sows will do.

PART VII.

POULTRY TOPICS.

STANDARD VARIETIES OF CHICKENS.

Farmers Bulletin No. 51, U. S. Department of Agriculture.

There are eighty-seven standard and a large number or promiscuous varieties of chickens raised in this country. The standard varieties are divided as follows:

(1) *American class.* Marred Buff, Pea-comb, Barred and White Plymouth Rocks; Silver, Golden, White, Buff, and Black Wyandotts; Black, Mottled, and White Javas; American Dominiques, and Jersey Blues.

(2) *Asiatic class.* Light and Dark Brahmas; Buff, Partridge, White, and Black Cochins; Black and White Langshans.

(3) *Mediterranean class.* Brown, Rose-comb Brown, White, Rose-comb White, Black, Dominique, Buff, and Silver Duckwing Leghorns; Black and White Minorcas; Andalusians and Black Spanish.

(4) *Polish class.* White-crested Black, Golden, Silver, White, Bearded Golden, Bearded Silver, Bearded White, and Buff-laced.

(5) *Hamburg class.* Golden-spangled, Silver-spangled, Golden-penciled, Silver-penciled, White and Black Hamburgs; Redcaps; Silver and Golden Campines.

(6) *French class.* Houdans, Crevecoeurs, and La Fleche.

(7) *English class.* White, Silver Gray, and Colored Dorkings.

(8) *Game and Game Bantam class.* Black-breasted Red, Brown Red, Golden Duckwing, Silver Duckwing, Red Pyle, White, Black, and Birchen Games; the same varieties for Game Bantams. Cornish and White Indian Games; Malays and Black Sumatra Games.

(9) *Bantam class other than Game.* Golden and Silver Sebrights; White and Black Rose-comb; Booted White; Buff, Partridge, White, and Black Cochins; Black-tailed, White, and Black Japanese, and White crested White Polish.

(10) *Miscellaneous class.* Russians Silkies, Sultans, Frizzles, and Rumpless.

For practical purposes the above ten classes may be grouped into four general classes, as follows:

(1) The general-purpose breeds: The American class.

(2) The meat or table breeds: The Asiatic class.

(3) The egg breeds: The Mediterranean class.

(4) The ornamental breeds: The Polish, Exhibition Games, Miscellaneous, and Bantam classes.

Following is description and illustrations of the American, Asiatic and Mediterranean classes:

The Plymouth Rock is the most popular of all varieties of poultry as a general-purpose fowl. Its medium size, hardy growth, and good laying qualities make it a practical fowl for the farm. The Barred variety is the most generally known of the Plymouth Rocks, and its history dates back a little over a quarter of a century. Various bloods were used in its making, the belief being general that it originally came from a cross between the American Dominique and the Black Java. It has also been shown that the Light Brahmas, Dark Brahmas, and Pit Game have been used in its making.

The Barred Plymouth Rock (fig. 1) is of a grayish-white color, regularly crossed with parallel bars of blue-black running in straight distinct lines throughout the entire length of the feather, and showing on the down or undercolor of the feathers. The barring is somewhat smaller on the hackle and saddle feathers than on other portions of the body. The bird is of medium size, with broad neck, flat at the shoulders, the breast is full, and the body broad and compact, medium-sized wings that fold gracefully, the points being well covered with breast and saddle feathers; a medium-sized head, ornamented with upright, bright red comb and wattles; a large, bright eye; and yellow beak, leg and toes places

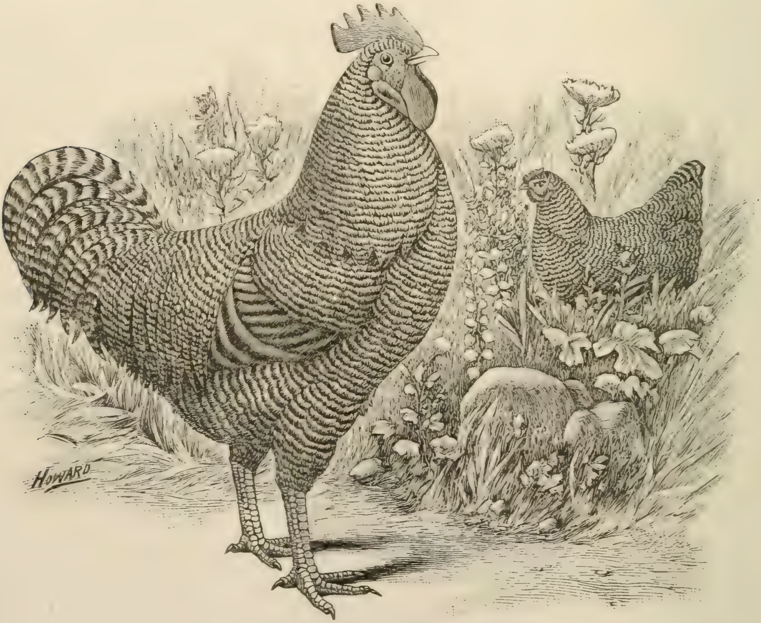


FIG. 1.—Pair of Barred Plymouth Rocks.

the picture before us in its entirety. The difference between the Barred and the Pea-comb Barred is that the latter has a small, firm and even pea-comb, instead of single comb.

For the farmer or market poultryman they are favorites, being of medium size, well proportioned, with a deep, full breast making a most admirable bird for market purposes. They are hardy, mature early, and make excellent broilers from eight to twelve weeks old. They are good layers the year round, and in winter they lay exceptionally well. Their eggs are brown in color and average eight to a pound. They are good sitters and excellent mothers.

The Barred Plymouth Rock, besides being a practical fowl, is also one of the most sought after by fanciers. No class is better filled at the average poultry show of the country than this. The graceful figure, upright carriage, and active nature endear it to all as a fancier's fowl. There is a fascination in breeding it for plumage, the more regular and even the barring the better (fig. 2). It requires much skill to breed for color, and two matings are generally used. An established rule for mating for cokerels is to use a standard-color male with medium-dark females, and for pullets use light male and dark females. The double mating is resorted to by many, yet the writer has seen rare specimens produced from single matings.

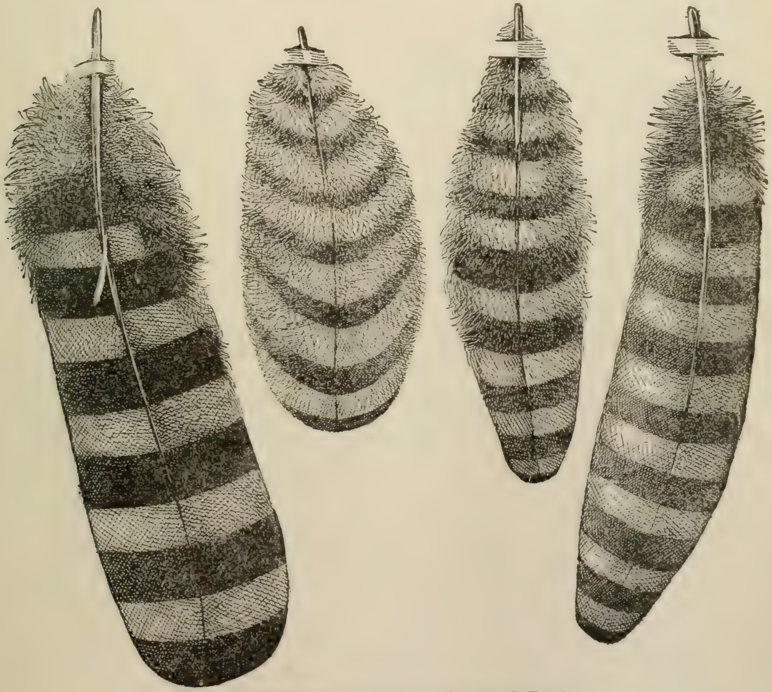


FIG. 2 —Feathers of Barred Plymouth Rocks.

The characteristics of the Barred Plymouth Rock are noticeable in the other varieties of Plymouth Rocks, excepting that of color. The size, shape, general outlines, and qualities are the same in the other varieties as in the Barred. The White Plymouth Rock is pure white in plumage throughout, and the buff variety is a clear buff, uniform in shade, except the tail, which is deep buff or copperish-yellow brown. The buff should extend to the undercolor as much as possible; the deeper the better.

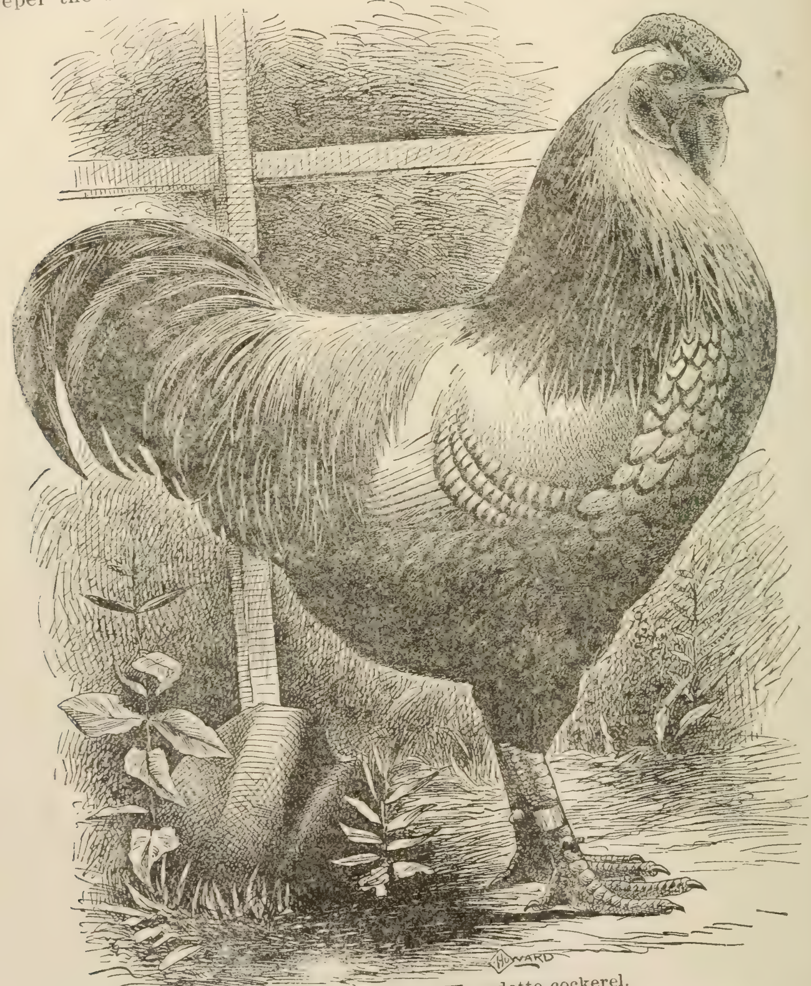


FIG. 3.—Silver-laced Wyandotte cockerel.

The standard weight of cocks is nine and one half pounds; hens, seven and one half pounds; cockerels, eight pounds; and pullets, six and one half pounds.

WYANDOTTES.

The Wyandotte (fig. 3) is another of the general purpose fowls and is rated next to the Plymouth Rock. From the first it sprang into popular favor and has continued so to the present time. Its origin is comparatively recent, dating back less than twenty-five years. It came originally from the Dark Brahma, Silver Spangled Hamburg and the Breda, a French fowl. Not a few authorities say that Wyandottes have Cochin blood in them, from the fact that their ancestors produced single combs and feathered legs.

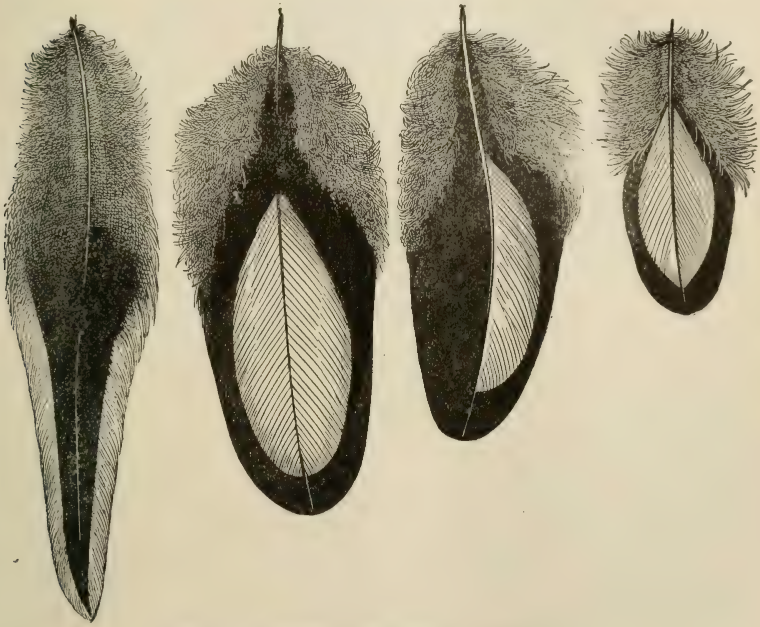


FIG. 4.—Feathers of Silver-laced Wyandotte.

For general purposes the Wyandottes have proven a success, being of medium size, weighing on an average a pound less than the Plymouth Rocks, hardy of constitution and prolific layers. They are easily cared for and bear confinement well. For table purposes they are of superior worth; their flesh is sweet, juicy and tender, making excellent broilers and roasters. As layers they are among the best, averaging from twelve to fourteen dozens a year, and as winter layers they do well under ordinary circumstances.

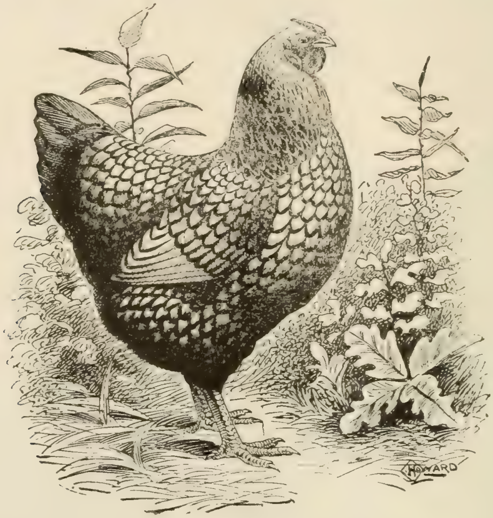


FIG. 5.—Silver-laced Wyandotte pullet.

There are five varieties of the Wyandotte breed, and it is only a matter of opinion as regards a choice of the best. The general characteristics are the same in all, the difference in color of plumage being the only distinguishing mark. The Silver-laced Wyandotte is of a silvery-white plumage, with regularly marked white lacing on breast and a generous distribution of white and black throughout the entire body. The cock has a silver-white head, rose comb, silver hackle, with a black stripe down the center of each feather, as shown in fig. 4; silvery white back; saddle same as hackle; breast black, with white center (see fig. 4); tail black; wings half black and half white, or rather, black edged with white; when wing is folded there should be a well defined bar across the wing; shanks and toes rich yellow, free from feathering. The hen of the Silver-laced variety (fig. 5) is marked similarly to the male, excepting the back and wing, which are whiter in male than in female. The breast of the female is of much importance in breeding good birds; the lacing should be large and distinct, and the white centers of each feather free from black or brown penciling.

The Golden Wyandotte is marked like the Silver, excepting that the color is golden-bay and black instead of white and black. The White variety is, perhaps, the favorite from the fact that it is not so difficult to breed to feather, the plumage being pure white throughout. It is for this reason the more practical fowl for the farmer or those who keep poultry for market. The Buff Wyandotte is in color a rich, deep, clear buff, uniform in shade throughout, except the tail, which is of a deeper buff or copperish-bronze color. The Blacks are of a rich, glossy black, with greenish sheen, excepting breast primaries, secondaries, tail and fluff, which are pure black.

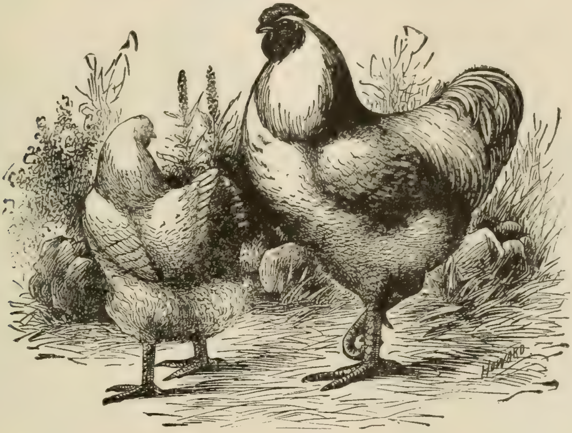


FIG. 6.—Pair of White Wyandottes.

The standard weight of cocks is eight and one half pounds; hens, six and one half pounds; cockerels, seven and one half pounds; and pullets, five and one half pounds.

JAVAS.

This variety is the oldest of the American class, and at one time was considered the most profitable of all breeds. At present Javas are not raised extensively; the more modern or newer breeds have seemingly supplanted them in popularity. There is no reason why this should be so, as they are practical and good general-purpose fowls. In size they are about like the Plymouth Rocks, but differ in general symmetry and appearance. They are good layers and do well in winter, and for table purposes they are nice eating. They mature early, are good sitters and mothers, and are easily kept in confinement.

There are three varieties of Javas: Black, Mottled and White. The Black (fig. 7) is more generally seen than the others, though the Mottled has of late years been very numerously represented at the shows. The plumage of the Blacks is glossy black throughout; the Mottled (fig. 8) is of broken black and white in wings, tail and sickles, and the balance of the plumage is evenly intermixed with white and black; the White Java is, as the name implies, pure white throughout. It has a small single comb, standing upright on the head in both male and female. The shanks and toes are free from feathers, yellow in color, with the bottom of feet yellow.

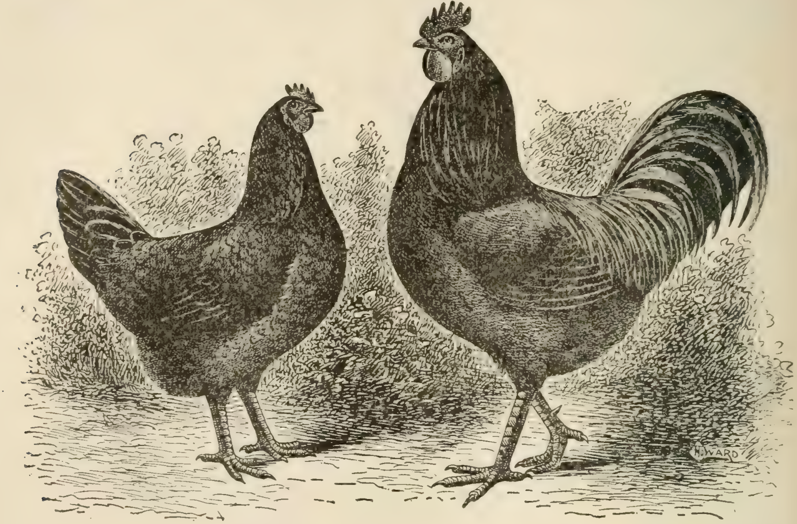


FIG. 7.—Pair of Black Javas.

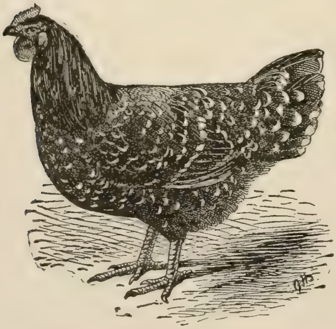


FIG. 8.—Mottled Java hen.

The standard weight of cocks is nine and one half pounds; hens, seven and one half pounds; cockerels, eight pounds; and pullets, six and one half pounds.

DOMINIQUES.

Similarity in plumage of the American Dominique and Barred Plymouth Rock has been the price of the former's popularity. The color is grayish-white, each feather regularly crossed with parallel bars of blue-black, producing the effect of a bluish-tinged plumage, the color being the same throughout. The illustration of Barred Plymouth Rock feathers shown in fig. 2 will do equally as well for the markings of the feathers of the Dominiques. They have rose combs, in both male and female, and bright yellow legs. Those who are partial to their color of plumage will find the Dominiques good birds to keep. They are good layers, hardy, mature early, and dress well for the table.

The standard weight of cocks is eight and one half pounds; hens, six and one half pounds; cockerels, seven and one half pounds; and pullets five and one half pounds.

JERSEY BLUES.

The least known variety of the American class is the Jersey Blue. It is one of the largest breeds of poultry, being in size between the Plymouth Rock and the Light Brahma. Their plumage resembles that of the Andalusian, being blue throughout. Their breast and fluff are light blue; hackles and sickles, very dark blue, approaching black; shanks and toes, dark blue, the lower surface of toes lighter in shade, and the nails white. They are not as good layers as are the others of their class, and are hardy and easily kept in confinement. They are not popular for table purposes, preference being given to yellow-skinned and yellow-legged birds.

The standard weight of cocks is ten pounds; hens eight pounds; cockerels seven pounds; and pullets five pounds.

BRAHMAS.

The leading variety of the Asiatic class is the Light Brahma (fig. 9). This fowl has a history that would fill pages were it recorded. These are the fowls which caused the "hen fever" of the fifties, about which so much has been written in later years. Their early history is a matter of controversy, the best authorities differing as to their origin.

They were first known as the "Brahma Pootras," "Gray Shanghais," "Chittagongs," "Cochin Chinas," and what not. The early breeder named them acording to his fancy for high sounding and sensational names to sell his stock. Fabulous prices were paid for them when the craze for fine poultry was at its height in the early days of the last half of the present century. The standard of the present Brahmas was fixed in 1869, and no deviation from the type then adopted has been made. They have stood high in popular favor since then without abatement; the vast number of breeders who are raising them fully attest their worth as a practical bird to the industry. The Brahma is a characteristic fowl; it is unlike other varieties, and it should not be confounded in shape with the Cochin.

The average Light Brahma male is in height twenty-six inches; back from the ground, sixteen inches; keel from the ground, eight inches; length of body, front of breast to rear of fluff, fourteen inches; height of tail, a trifle over twenty-one inches; saddle hangers to rear of fluff, two and one fourth inches; eye, from tip of beak, two and one sixth inches; length of head and beak, three and one half inches; breasts to rear of a drop line from point of beak, three-fourth to one and one fourth inches. As specimens depart from this proportion they become awkward and valueless as exhibition stock, and often also as egg producers. In shape, oblong, with full, broad and round breast, carried well forward. The fullness and oblong shape is typical of the Brahma and is characteristic of prolific birds. The curves of neck and back are similar to those of the outlines of an egg.

In plumage the male is pure white, excepting hackle, tail and flights, which are black, and white striped with black. Any other color but white and black is against the standard-bred bird. The hackle is white with a black stripe extending down the center of each feather and tapering to a point near the extremity (see fig. 10). The tail feathers are black, and sickles are glossy greenish black. The shanks are well feathered, with the feathering extending down the middle toe; the toe feathering may be white or white sprinkled with black, pure white preferred. A small pea comb (see fig. 9), broad crown, projects over the eyes; bright red face, wattles and ear lobes are essential to a good head. The shanks and toes are bright yellow.

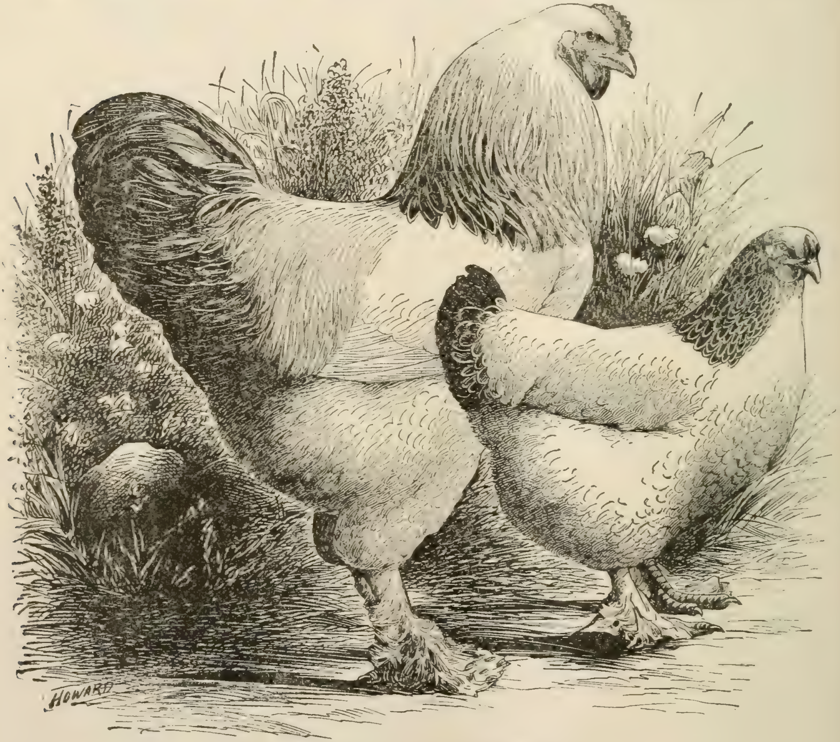


FIG. 9.—Pair of Light Brahmas.

The Brahma female is much like the male in head qualities, having broad comb, projecting well over the eyes, and small pea comb. The head of female should be masculine in appearance. The head is white;

hackle, white striped with black, as in male; cape, white and black, but is completely covered by hackle when the bird stands erect; tail black, excepting the two highest main tail feathers, which may be edged with white; tail coverts, one or more rows, distinctly covering a part of both sides of the main tail, two rows being preferable, are black edged with white.

The Light Brahmas are valuable birds for the farm. They have always been made to pay for their keep and have seldom been set aside by any who have bred them. They are the largest of domestic poultry, and do as well in confinement in small runs as on free range. As layers they will average from twelve to thirteen dozen eggs a year, and lay exceptionally well in winter. Their eggs are large, about seven to a pound, of a rich brown color and excellent flavor. For table purposes the birds are good; they do not mature as early are do the varieties of the American class, yet they are hardy, and can be raised with as much ease as any of the early-maturing varieties. As sitters and mothers they are fair.

The Dark Brahmas are not so popular as the Light—the difficulty being in breeding them true to feather. Their delicately marked plumage is extremely pretty when bred to standard requirement, but if not so bred it becomes most disagreeable and unsatisfactory to the breeder. The head and neck of a Dark Brahma male are similar to those of the Light, the head being white and the hackle rather more striped. The back is nearly white, a little black appearing here and there. The black should predominate between the shoulders, but is nearly hidden by the hackle flowing over it. The saddle feathers are, like the hackle, silvery white, striped with black, which should be distinct. As the feathers approach the tail the stripes become broader till they merge into the tail coverts, which are rich, glossy, green-black, with a margin or lacing of white. The tail is pure black with green gloss. The wing coverts are black, forming a distinct black bar across the middle of the wings, while the ends of the secondaries have a large black spot on the end, making the top edges of the wings appear almost black. The remainder of the secondaries are white on the lower half and black on the upper. The flights

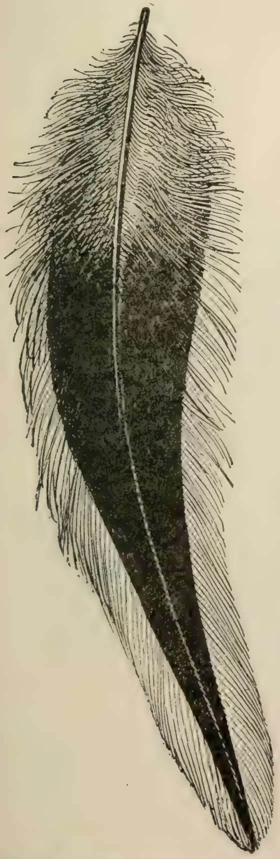


FIG. 10.—Hackle feather of Light Brahma cock.

are all black, except a narrow fringe of white on the lower edge. The breast is black; the thighs and fluff either black, or black very slightly mottled with white. The shank feathering should correspond with the breast, being black if the latter be black, and slightly mottled with white if not. The shanks are deep yellow, inclining to orange.

The color of females is a white ground, closely penciled with dark steel gray, producing a beautiful effect, frosted or silver gray in appearance. There should be no show of pure white in the plumage except in the margins of the hackles. Unless extreme care be taken in mating, the hens are likely to have a dingy color, and the pullets are apt to have necks almost white for some distance down. These light-necked birds generally breed to worse, but the evil may be remedied by choosing birds for breeding whose heads are distinctly marked. The shape and character of the markings of the Dark Brahma pullets also vary. They should be medium-sized, so that the pencilings can be clearly discerned at a short distance. A great point in regard to color and marking in Brahma pullets is that it should be uniform over the body, and the hackles should be silvery white, heavily striped with rich black, and the shank feathering penciled same as body.

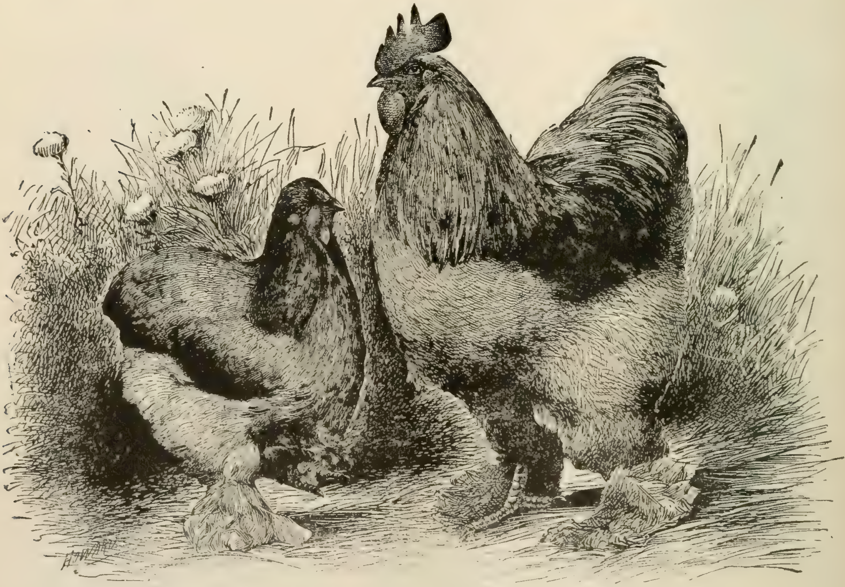


FIG. 11.—Pair of Buff Cochins.

For practical purposes the Dark Brahmas are not to be commended as highly as the Light. The close breeding for points in feathers is likely to interfere with their productiveness, yet with proper attention and care they can be bred profitably as well as for beauuty.

The standard weight of Light Brahma cocks is twelve pounds; hens, nine and one half pounds; cockerels, ten pounds; and pullets, eight pounds. The standard weight of Dark Brahma cocks is eleven pounds; hens, eight and one half pounds; cockerels, nine pounds; and pullets, seven pounds.

COCHINS.

The four varieties of Cochins are very popular with breeders. They are second to the Brahmas in the meat breeds, weighing but a pound lighter than the Light Brahmas. Old and experienced breeders of Cochins are pronounced in praise of their qualities as profitable fowls. They are hardy, good winter layers of rich, brown, medium-sized eggs, and fairly good table fowls. The chicks grow well and develop rapidly under proper care.

The Buff variety (fig. 11) is the most generally bred; their color tone offers an attraction to fanciers that is hard to resist. Both male and female are of a rich, deep, clear buff, uniform in shape throughout except the tail, which should be a deeper buff or copperish bronze, undercolor same as surface color, but of lighter shade and should extend to the skin. In breeding select females as near as possible to the desired shade of buff, as free from dark or white in wing and tail, and of as even a color as can be. To such females mate a cock of deeper shade, with some little black in wing, and tail of deep buff of a coppery luster.

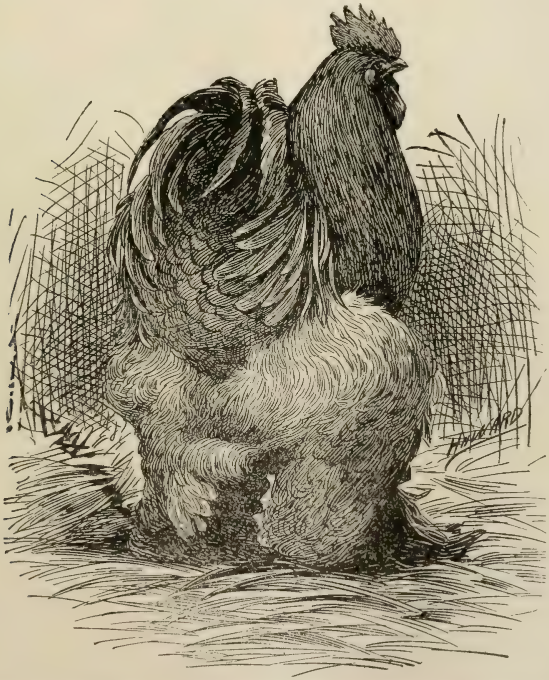


FIG. 12.—Back view of Buff Cochin cock, showing full feathering.

This mating will produce good results in cockerels and pullets. The heavy leg and foot feathering so characteristic of the breed should have a constant care and attention. While the feathering should be abundant, all semblance to vulture hock, or stiff feathering, should be avoided.

The Partridge Cochin (fig. 13) is a beautiful fowl, yet difficult to breed, and in plumage is much after the pattern of the Dark Brahma, the color being red and brown, instead of the steel-gray effect of the latter.

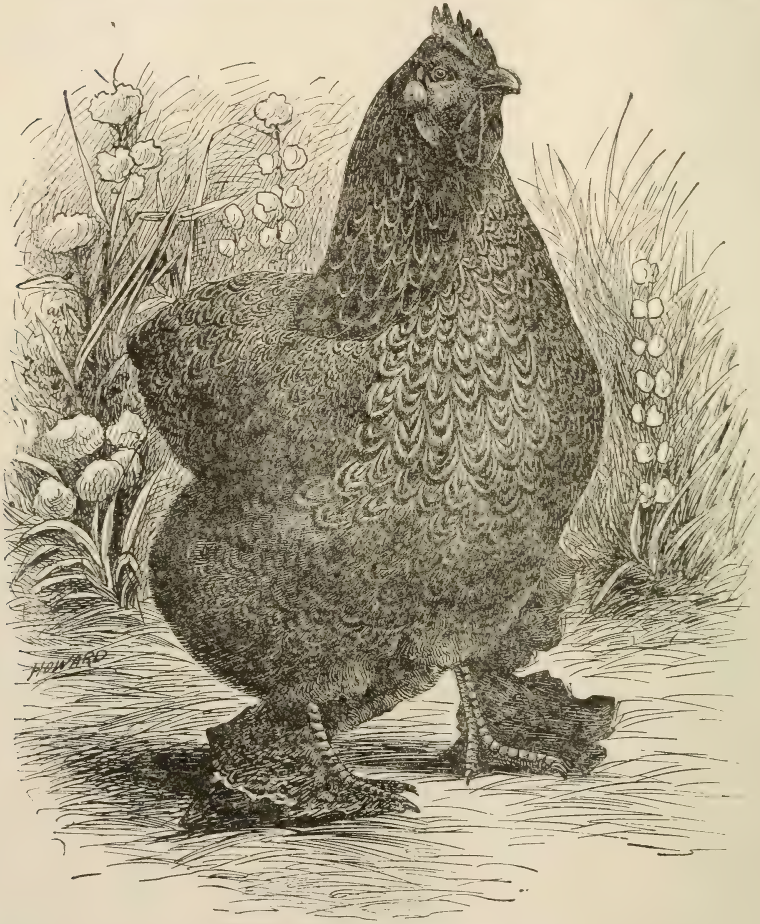


FIG. 13.—Partridge Cochin hen.

The head of male, in color, is bright red; hackle, bright red or orange red, with a distinct black stripe down the center of each feather; saddle red; hackle, bright red or orange red, with a distinct black stripe down the center of each feather; saddle feathers same as hackle; breast and body, rich deep black; wing bows, red; primaries, black on inside web, with a bay edging on the outside web; secondaries, black on the inside web and rich bay on the outside web; terminating with greenish-black at the end of each feather; wing coverts, greenish-black, forming a well defined bar of that color across the wing when folded; tail, black; sickles, coverts, and lesser coverts, glossy greenish-black; the latter may be edged with red; thighs, black; shanks, yellow, and well covered with black or brownish feathers, the middle toes being also well feathered.

The female is the prettier of the two. Her head is small and of a rich brown plumage, with a stout, well-curved beak, yellow in color. Her eyes are bay and mild in expression. The head is ornamented with a small single comb, set perfectly straight upon the head and bright red in color. The wattles are small, well rounded, and fine in texture; the ear lobes are well developed and are also fine in texture.

The neck is neatly curved, with abundant hackle flowing well over the shoulders. The plumage is bright red or orange red, with a broad black stripe down the middle of each feather. The black stripe in a good feather should run to a point near the end of the feather. This stripe should be free from penciling, but the standard permits a slight penciling of the black. (See fig. 14.)

A good back and cushion help to make the bird. Her back should be broad and flat, the broader the better, and the cushion should rise with a gentle convex curve and partially cover the tail. The plumage of back and cushion is a reddish-brown in color. Each feather is penciled with a darker brown; the outlines of the penciling conform to the shape of the feather. The breast is one of the most important points of a good hen, and should be broad and massive. The plumage is of the same reddish-brown color as the back. The penciling on the breast is perhaps a little more distinct and open than on the back; the outlines of the penciling should be sharp and conform to the shape of the feather.

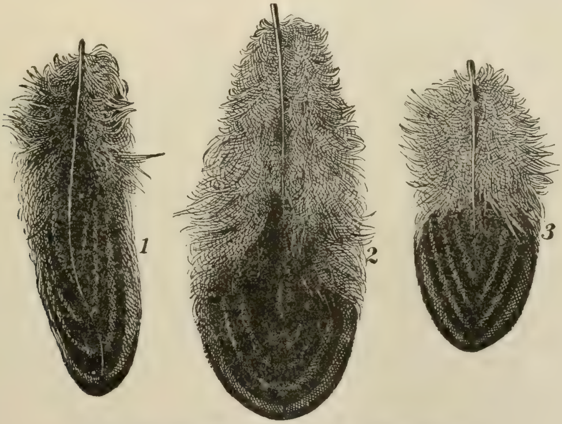


FIG. 14.—Feathers of Partridge Cochin hen.

The body is broad and deep behind and of the same plumage as the breast. The fluff is very abundant, covering the posterior portion of the bird and standing out about the thighs. Wings are small and the primaries fold closely under the secondaries; the bows are covered by the breast feathers and the fluff conceals the points. The primaries are very dark brown or blackish-brown in color; the inner web of the secondaries is a blackish-brown and the outer web is a blackish-brown penciled with a lighter brown. The coverts are similar in color and penciling to the plumage of the breast.

The tail is small and short, is carried almost horizontally, and is partly concealed by the cushion. In color it is black, except the two main tail feathers, which are penciled. The tail coverts are penciled same as breast and body. Thighs are large and well covered with soft feathers; the feathers on the lower part curve inward around the hock and hide the joint on the outside. The feathering of the thighs is of the same shade and color as that of the body. Shanks are short and yellow, and heavily covered with feathers of same color as thighs. The toes are well spread and yellow, the outer and middle toes being feathered throughout their entire length.

Black Cochins (fig. 15) are much more easily raised than are either of the varieties thus far described. Being of one color, the care bestowed in breeding particolored or penciled birds is not necessary, and the time may be spent in furthering their general utility in egg production. A one-colored bird is the more practical bird for the farmer and market poulterer. The Black Cochin is of a rich glossy black plumage throughout. The White Cochin is pure white in plumage.

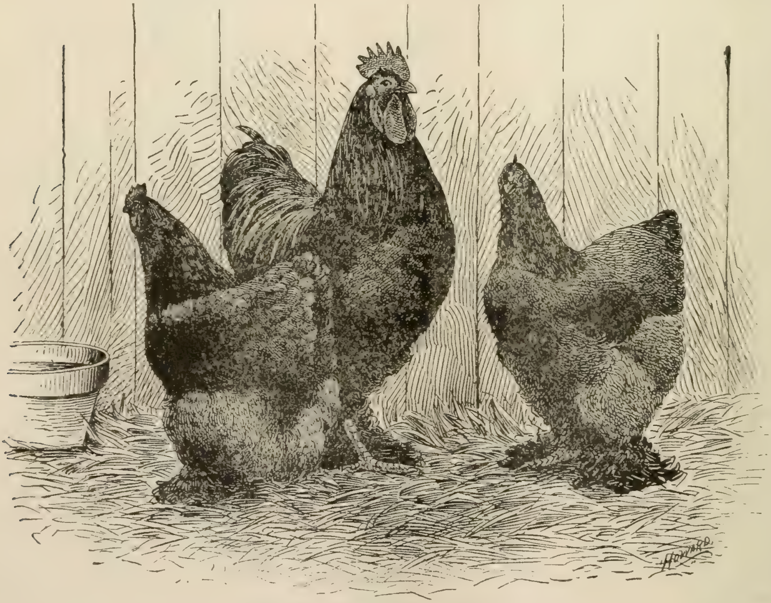


FIG. 15.—Trio of Black Cochins.

The standard weight of Buff, Partridge, and White Cochin cocks is 11 pounds; hens, 8½ pounds; cockerels, 9 pounds; and pullets, 7 pounds. Black Cochins are of the same weight, excepting cocks, which should weigh 10½ pounds.

LANGSHANS.

Langshans are the smallest and most active of the Asiatic class. They are practical in more senses than one, and their prolific laying and other excellent qualities make them profitable for the farmer and market poultryman. They constitute one the oldest breeds of poultry and have always been held in popular esteem. The shape of the Langshan is distinct from that of the Brahma or Cochin, and should not be confused with either of the last-named breeds. Fig. 16 shows the accepted contour of the Langshans, and a comparison with the birds in figs. 9 and 11 shows at a glance the characteristics of the Langshan as compared with the other Asiatics. Langshans have white flesh and dark legs, while the others are yellow-skinned and yellow-legged. The quality of the flesh of the Langshans is excellent, being fine grained, tender and nicely flavored. As layers they rank among the best, averaging from twelve to thirteen dozen a year, and as winter layers they are to be recommended. The chicks are hardy and mature early. Langshans are good sitters and mothers, being of gentle disposition; they are

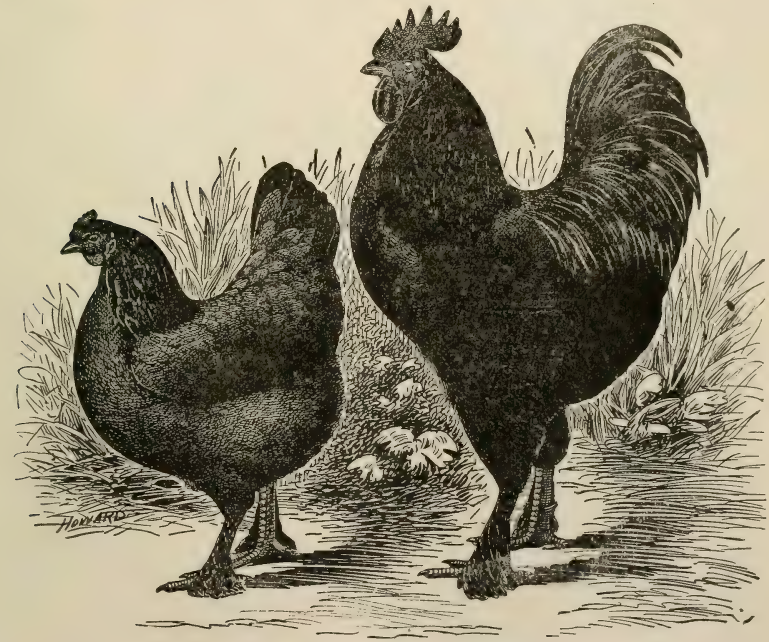


FIG. 15.—Pair of Black Langshans.

easily kept, either in confinement or on free range. Being excellent foragers. they are ideal fowls for the farm, and will gather during the year a considerable proportion of their food.

The Langshan is a stylish, medium-sized bird, not overgrown or gawky in appearance, of active nature, and lively disposition. Many confound the Black Langshan with the Black Cochin. This need not be, as the following comparison between the two varieties shows: The Black Cochin is square in shape, with heavy-looking neck and legs, plenty of fluff and leg feathering, cushion rising from middle of back to tail, tail short, small, and almost concealed by cushion; neck, breast, cushion, and tail all represented by convex lines. Langshan head, small for size of body, comb medium-sized, well up in front, and arch shaped; Cochin head, larger than that of the Langshan and not so arched over the eye; comb smaller, low in front, and almost straight on top of serrations. Langshan back, short and concave; that of the Cochin, medium length, slightly convex, and large convex cushion Langshan fluff, moderate and close; that of the Cochin extremely full and loose. Langshan wings somewhat large and inclined downward, quite prominent at shoulders; the Cochin wings smaller and almost hidden by the fluffy plumage of cushion and fluff. Langshan breast full, deep, and carried well forward; Cochin breast not so full and deep, but broader. Langshan legs medium in length, small bone, long tapering toes, color of shank, bluish black showing pink between scales, which are nearly black; Cochin legs shorter, stouter, larger bone, toes shorter and stouter, color of shanks black or yellowish black.

There are two varieties of Langshans—the Black and the White. The Black in plumage of neck, back, saddle, sickles, a glossy metallic black, with greenish sheen; breast, primaries, secondaries, tail, fluff, shank, and toe feathers, black. The undercolor is black or dark slate. The White Langshan is pure white throughout.

The standard weight of cocks for both varieties is ten pounds; hens, seven pounds; cockerels, eight pounds; and pullets, six pounds.

LEGHORNS.

Leghorns are the best known of the egg-producing varieties or Mediterranean class. They are the premiers in laying and the standard by which the prolificacy of other breeds is judged. As to the origin of the Leghorns there are differences of opinion, and there is but little information to be found anywhere concerning their early history. It is generally conceded that a race of fowls bearing a close resemblance in many respects to the Leghorn has existed in Italy and other parts of the Continent of Europe for a long period. That this race has been widely disseminated admits also of little doubt, inasmuch as at the present day it is known in Denmark and other countries as the Italian. There seems to be good ground for the statement that Leghorns were first introduced into America from Italy. The story goes that as early as 1834 a vessel from Leghorn brought to this country as a part of its cargo a small shipment of fowls, which were at once named "Leghorns."

They immediately became popular their prolific laying and nonsitting qualities being recognized at this early date.

White and Brown Leghorns were the first varieties known. Modern breeders are responsible for some of the subvarieties of the breed; and, in point of color at least, exhibition birds of today, even of the older varieties, vary considerably from those seen at the present time in Italy.

The Leghorn fowl holds the same place among poultry that the Jersey holds among cattle. The question of profit in poultry has been decided in favor of egg-producing breeds. Leghorns are lively, active, and of a restless disposition, the best of foragers, and will pick up a good part of their living during the year. They are light eaters and the cost of raising them to maturity is about one half that of the Asiatic varieties. They mature early, feather quickly, the pullets often begin laying when four months old, and cockerels crow at the same age. They are the best layers, averaging between one hundred and fifty and two hundred eggs per year. Their eggs are pure white in color, and weigh about ten to

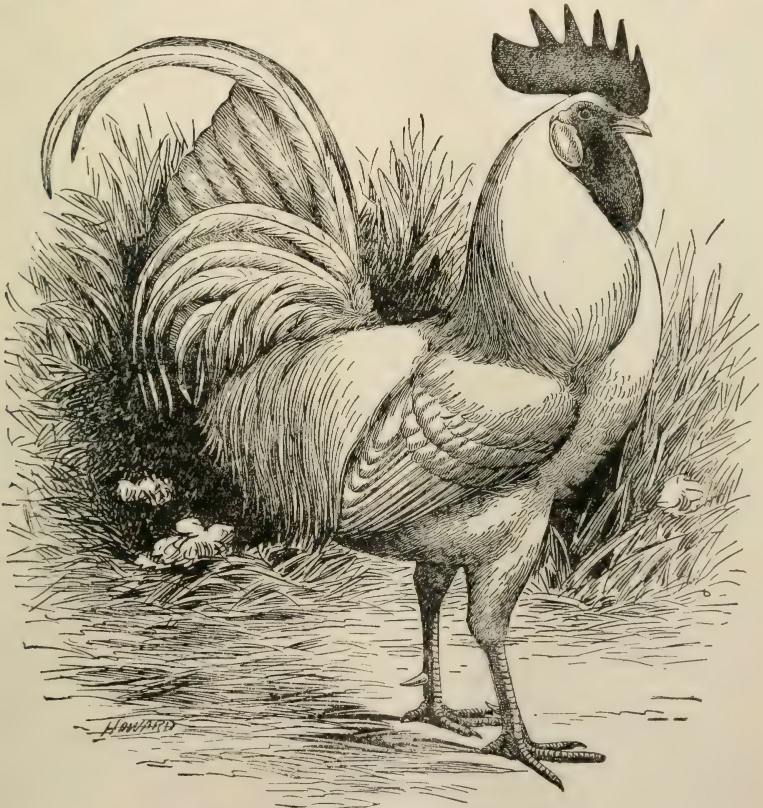


FIG. 17.—Single-comb White Leghorn cock.

the pound. As table fowls they are fairly good. By many they are considered excellent. The only thing that can be said against them is that they are small in size. Altogether, they are one of the most profitable breeds of poultry that can be kept upon the farm, and the cheapness of their keeping will allow the raising of two Leghorns for the cost of one Asiatic. They must be warmly housed in winter to lay well and to protect their pendulous wattles from frostbite.

In shape a Leghorn cock (fig. 17) should be graceful; body, round and plump, broad at the shoulders, and tapering toward the tail. The tail should be well balanced on a fair length of shank and thick, the length of leg giving the bird its sprightly and proud carriage. Closeness of feathering adds to the general shape and secures a freedom from angles which always proclaims the pure bred, typical specimen. The breast should be full, beautifully curved, rather prominent, and carried well forward. Neck, long, well arched, and carried erect; back, of medium length, with saddle rising in a sharp, concave sweep to the tail; tail, large, full, carried upright; the full flowing tail, and long, well-curved sickles are characteristics of the bird that are much thought of. The wing is long, well folded, and tightly carried. Hackle and saddle feathers, long and abundant and flowing well over the shoulder and saddle. The legs are bright yellow and free from feathers; toes also yellow, but a dark shade is allowable. The head is the prettiest portion of the bird, being short and deep; yellow beak, full, bright red eyes, and bright red face. The comb is single, of medium size, perfectly straight and upright upon the head, free from side sprigs, deeply serrated with five or six points, and bright red. The comb should extend well back over the head, with no tendency to follow the shape of the neck. Ear lobes, white or creamy white.

The Leghorn hen in many respects resembles the cock, excepting carriage of comb and sexual differences. In shape and carriage the hen is even more graceful and sprightly than the cock, very close in feather, and rather small in body, though somewhat long in back. Her breast is full, very round, and carried high; legs fairly long, and shanks thin; tail carried closely and well up. The general carriage should be upright. Her comb is the marvel of her beauty; it is single and falls gracefully to one side, but not in a limp manner, or so as to

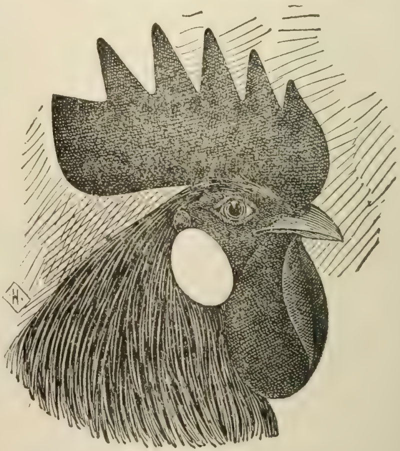


FIG. 18.—Head of Single-comb Brown Leghorn Cock.

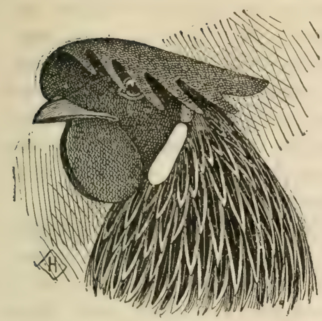


FIG. 19.—Head of Single-comb Brown Leghorn hen.

obscure the sight. Fig. 19 shows an ideal comb of Leghorn female. Legs, comb, and face are the same color as in the male, but the ear lobe is much smaller.

There are six standard varieties of Leghorns: Black, Brown, Buff, Dominique, Silver Duckwing, and White.

The Black Leghorn is a popular bird, and a favorite with those who are partial to its color of plumage. The Black Leghorn is mistaken by many for the Black Minorca, but is quite different in type. The Minorca is larger in size, has a longer body, larger comb, and dark slate or nearly black shanks and toes. The plumage of the Black Leghorn is a rich glossy black throughout. Comb, face, and wattles, bright red; ear lobes white; and shanks yellow, or yellowish black.

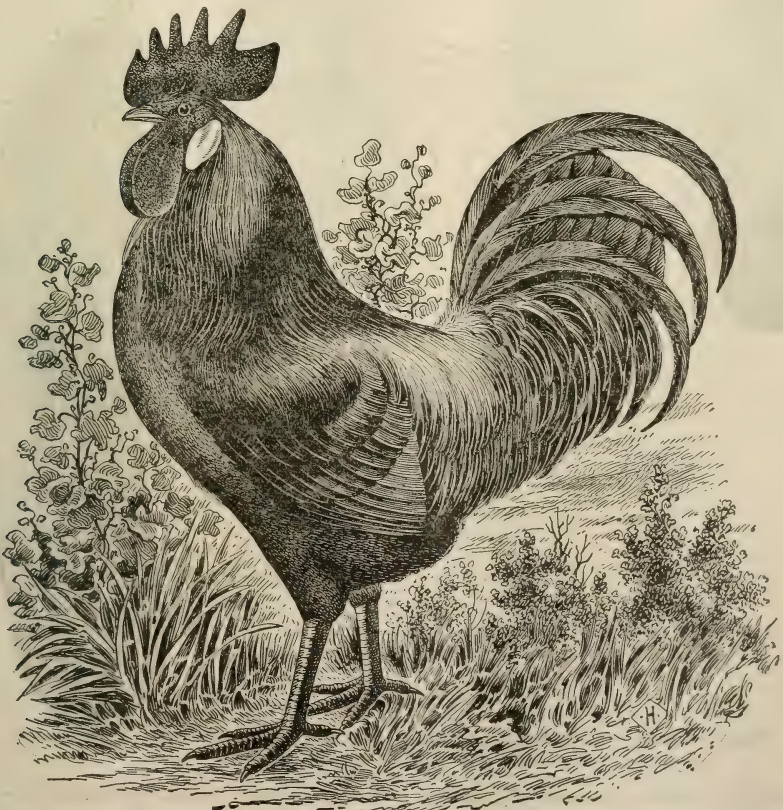


FIG. 20.—Single-comb Brown Leghorn cock.

The Brown Leghorns (fig. 20) are one of the prettiest, as well as the most commonly bred of the Leghorn varieties. They are the most difficult of all to breed to feather. They have merited the confidence of poultry lovers for a long time and their hardy constitutions have thwarted rough usage and promiscuous interbreeding to efface their characteristics. They are a fixed breed and their merits are noticeable from the newly hatched chick to the oldest specimen; they are stamped with the indelible marks of royalty only to be found in a thoroughbred.

In mating Brown Leghorns opposites must be considered. Should the male be fine in all points except comb or leg, select females strong in this point to mate with him. The most successful breeders use a double mating, one pen to produce exhibition birds of each sex. Fine birds, both cokerels and pullets, can be bred from the same pen by using slightly different types of females. The same male often will breed the finest of both exhibition cockerels and pullets, but it is a rare case to

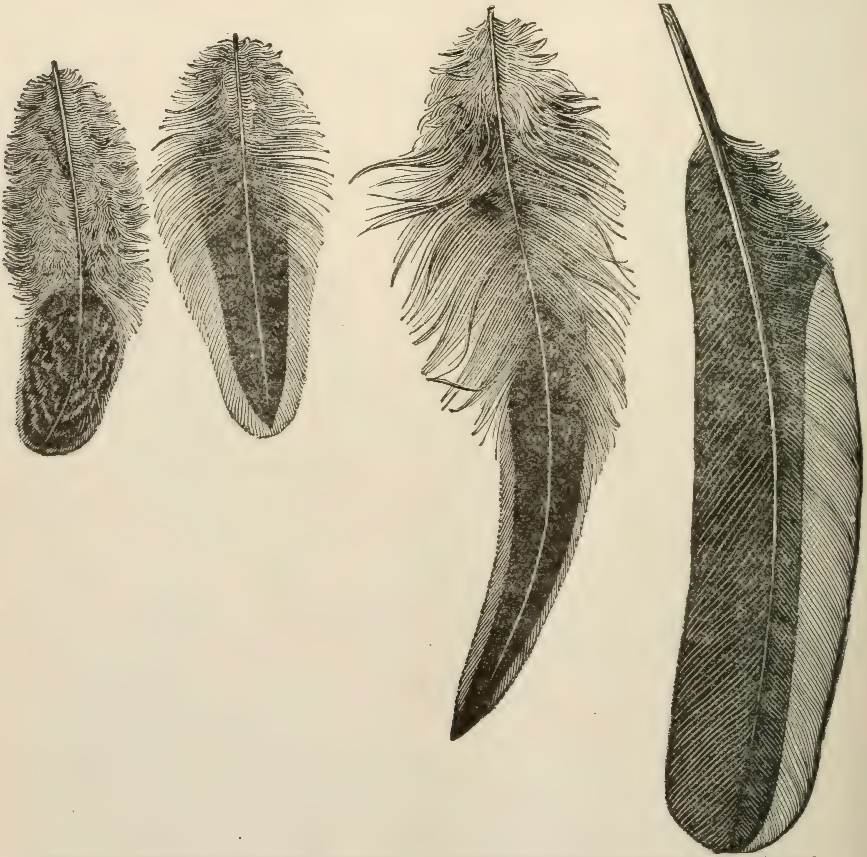


FIG. 21.—Feathers of Brown Leghorns; *a*, back and hackle of female; *b*, hackle and wing feather of male.

have a female breed both sexes of a remarkable quality. When two pens are used, at the head of the pen mated to produce the cockrels place a fully developed cock with no serious fault, standard color, especially strong in comb, lobe, hackle, and saddle, a dark undercolor preferred. To him mate hens of a shade darker than standard, with small, evenly serrated, standing combs; a trifle brick color on wings is no objection. as it will give a brighter color on wing bows of the cockerels. Shafting on the back will also help the black stripe in the saddles. The pullets raised from this pen will be too dark for exhibition, but they will be a great help in breeding cockerels the next season. The male at the head of the pen mated to produce the pullets should be from a pullet strain, and bred directly from an exhibition hen. His color is a trifle light; comb large, but evenly serrated, if thin near the top, all the better; hackle, well striped (see fig. 21), but none in saddle; undercolor of hackle and saddle may be light gray or white; wing bows should show more purple than red, as too much red shows signs of being bred from a "bricky" hen. To him mate exhibition females having light brown penciled with darker brown on back and wings, all one shade, free from shafting on back and brick color on wings. These hens should have the large comb, lying over but firm and strong on the head, so it does not lie close to the eye and face. The cockerels raised from this mating are the birds to use for breeding females the next year. By breeding Brown Leghorns in this manner we have two distinct lines of blood, and they should never be crossed.

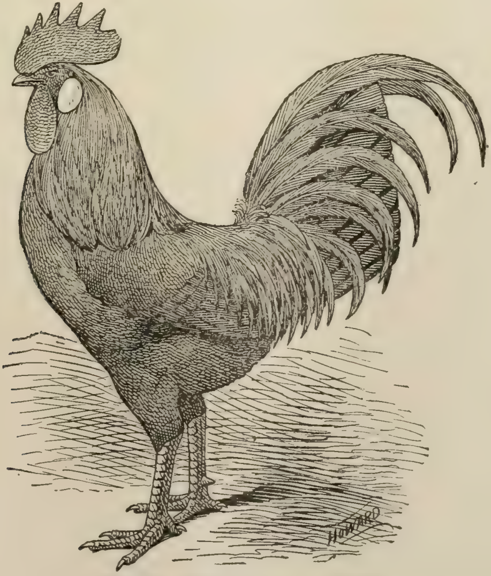


FIG. 22.—Buff Leghorn cockerel.

The Buff Leghorn (fig. 22) is the most recent acquisition to the Mediterranean class. It is a beautiful bird, and one that will win its way wherever bred. Buff-colored birds have many admirers, and those who have bred them are pronounced in praise of their qualities. Besides having the general characteristics of the Leghorn type, the Buff Leghorn cock has rich buff-colored hackle and saddle, in shade from lemon to cinnamon, but of even, solid color in keeping with the rest of the plumage; the back and the wing bow exactly match the plumage; tail, of the same general tint, but richer, deeper buff is preferable, the standard giving for tail a rich, deep buff or copperish-bronze. The remainder of the plumage is of a slightly lighter shade, but even in color throughout, with no semblance of a patchy or mottled plumage. White and black feathers in plumage are objectionable; solid white or solid black feathers will disqualify the bird. The hen is of the same color as the cock.

Dominique Leghorns are not so generally known. Their color is much like that of the American Dominique and Barred Plymouth Rock, and is what is known as "Cuckoo" by English breeders. The body color is grayish white, each feather regularly crossed with parallel bars of blue-black, producing the effect of a bluish-tinged plumage. This color is the same throughout. The ground color of each feather is a clear, light bluish gray. The shanks and toes are bright yellow and eyes bright red.

Silver Duckwing Leghorns are not generally bred in this country, though they are frequently seen in the showrooms. They are considered as profitable as any of the other Leghorn varieties, and in point of beauty they are very interesting and fascinating. They take the name "Duckwing" from the similarity of the steel-blue wing bar to that of the Mallard or wild duck, the name being first given to a variety of games—the Silver Duckwing Game. The hackle and saddle feathers of a Silver Duckwing Leghorn cock are pure silvery white, without the slightest straw or creamy tinge, with a narrow black stripe along the center of the lower hackle feathers. Back, saddle, wing bow and wing bay, pure white; breast, under parts, wing bar, and tail, dense lustrous black. The Silver Duckwing Leghorn hen has a silvery gray hackle, with a narrow black stripe through the center of each feather. The breast is light salmon, shading off to gray toward the sides; the body color when viewed at a short distance should appear gray, with a faint bluish tint all over. A tendency to ruddy gray, either in ground color or penciling, is objectionable. The tail is black or dark brown, except the two upper feathers, which are light gray. The penciling or markings are irregular or wavy.

The White Leghorn, like the Brown, is one of the most generally bred of the Leghorn varieties. It is, no doubt, the most advantageous to breed for profit, and the easiest to raise on the farm. Being of one color in plumage these birds are more successfully raised and cared for than the parti-colored varieties. Their plumage is pure white throughout, and feathers other than white will disqualify them. It has been a matter of much speculation as to which variety of Leghorns is most prolific in egg production. This is a difficult question to properly adjust to the satisfaction of the specialty breeders, but from a conservative standpoint it is generally considered that the Whites have slightly the advantage over the others. Phenomenal individual egg records have been made by almost all varieties, but the above opinion is advanced from the general results obtained from various sources.

There are subvarieties both in Brown and White Leghorns—the Rose-comb Brown and the Rose-comb White. The only distinguishing difference between the last named and the other varieties is in the comb. The Rose-comb White and Rose-comb Brown Leghorns have a small rose comb (see fig. 23), square in front, firm and even upon the head, tapering evenly from front to rear, without inclining to one side, the top comparatively flat and covered with small points, or corrugations, terminating in a well-developed spike in the rear. There is no standard weight given for Leghorns.

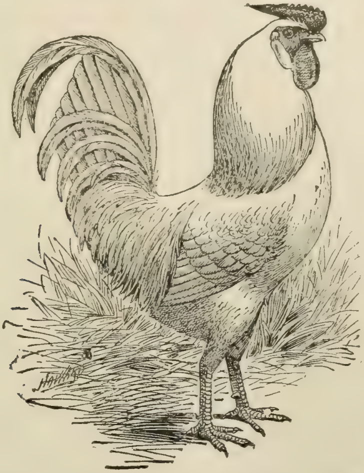


FIG. 23 —Rose-comb White Leghorn cockerel.

MINORCAS.

The Minorcas belong to the Mediterranean class, and they are placed next to the Leghorns in laying qualities. They are in appearance very similar to the Leghorns. Their general outline is, in fact, that of the latter, but of more length of body and heavier in mold. Indeed, they are the only variety of the Mediterranean class that has a given weight which approaches that of the Wyandotte, being only one-half pound lighter. The origin of the Minorcas, like that of so many others of our profitable poultry, is much in doubt. Some are of the opinion that they originally came from Minorca, one of the Balearic Isles, in the Mediterranean Sea, while others contend they are a variety of the Black Spanish. Be that as it may, they are one of the most profitable breeds of poultry for the farm.

The Minorcas are good for table purposes, the flesh being white or light-colored, and fine-grained. Their chief advantage is their egg production. They are nonsitters, and year-around layers. As winter layers they are exceptionally good when kept under fairly favorable circumstances. While the Leghorn surpasses them in the number of eggs laid, the Minorca's eggs are larger, and equal the output in bulk. Their eggs are white, and average eight to the pound. They lay from twelve to fifteen dozen a year. Being of an active, restless disposition they keep in splendid condition and make good foragers. For suburban poultry keeping they are very practical birds, and net good results to the keeper. They are hardy, easily raised, and mature quickly.

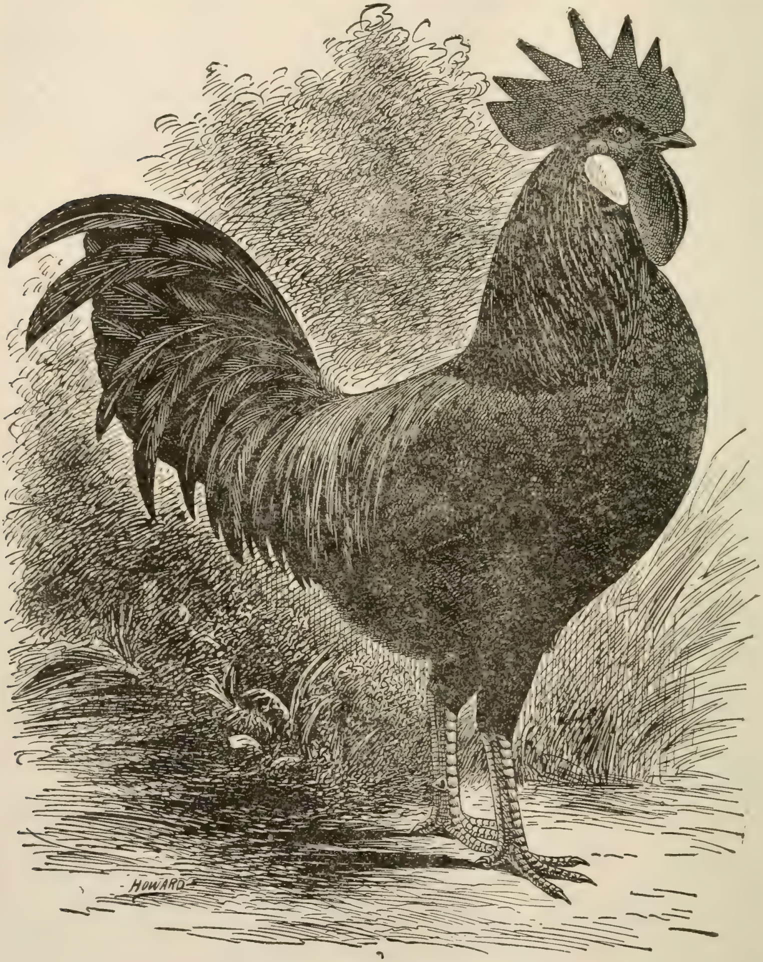


FIG. 24.—Black Minorca cockerel.

The Minorca fowl is large in outline, well bodied; stands well up on its legs; has a broad chest, and a long, flat back, with tail carried upright. Many breeders dispute as to the carriage of the tail. The standard says "upright," while the preference is almost universally expressed by breeders that it should be carried "well back." The upright position gives the tail the Leghorn type (see fig. 17), while the typical Minorca differs somewhat from it by being more horizontal, as shown in fig. 24. The body of the Minorca male is long, square in front, tapering from front to rear. When standing erect, the body of male is at an angle of nearly forty-five degrees. Thighs are stout; shanks, medium in length, stout in bone, and in color dark slate or nearly black; comb, single, large, perfectly straight and upright, evenly serrated, and extending well over back of head. The comb of the Minorca is larger and more bulky than that of the Leghorn. Wattles are thin and pendulous, corresponding with size of comb; car lobes, pure white. The female is in body of the same general appearance as the male, rather long, broad, and deep. Her comb is single, large, and drooping to one side; like comb of male, her comb is perceptibly larger than that of the Leghorn female. Black Minorcas are in plumage a rich, glossy black throughout, and gray tips are considered serious defects. The White Minorca is as popular as the Black, and takes the same position as does the White Leghorn in its class. The standard qualifications are equal for the two except in color, and that must be pure white throughout, feathers other than white disqualifying; the other qualities are equal, as to profitableness, between the two varieties. The comb, face and wattles are bright red, free from white in face; eyes are dark hazel or red.

Before concluding in regard to Minorcas, it is worthy of note that the latest acquisition to the breed is the Rose-comb Black Minorca. The only objection that has ever been raised against the varieties of the Mediterranean class is their susceptibility to frostbite of the comb. Their combs are so large that continued cold or exposure is sure to result in this injury. To obviate this one defect, if it may be so termed, in this valuable class of birds has been the purpose of breeders in producing a bird that possesses the other qualifications, but with low rose comb. There are two standard varieties of Minorcas—the Black and the White. The Rose-comb Black Minorca is not recognized as a standard variety as yet, but indications point to its admission as such in the near future. Many good specimens have been bred and exhibited at the recent shows, and success in making this variety seems assured. The head of the Rose-comb Black Minorca male should be medium in length; beak, stout and black; eyes, dark red; face, smooth and red; comb, rose, straight, and set close and even on the head. In size the comb should be between that of the Wyandotte and the Leghorn; wattles, medium in length and not so large as in single-comb variety; ear lobes, pure white, large, smooth and almond shaped. The head of female is similar to that of the male—medium in size; face, red; comb, small and even on the head; wattles, medium in size, thin, and bright red; ear lobes, pure white, large and even.

The standard weight of a Minorca cock is eight pounds; hen, six and one half pounds; cockerel, six and one half pounds; and pullet, five and one half pounds.

ANDALUSIANS.

The Andalusian (fig. 25) is one of the prettiest of the feathered race, being of a beautiful light and dark blue plumage. It is called the Blue Andalusian, and is the only variety of its breed. It is not as popular in this country as it should be, owing to the sentiment against white skin and blue shanks. English and French poultrymen prefer these qualities in a bird, and with them it is very popular. The hens are nonsitters and splendid layers of large white eggs, equaling in size those of the Minorcas. Specimens of their eggs have been seen in competition and have won the award of merit for size and weight. The chicks are hardy, mature early, and the pullets begin laying when five or six months old.

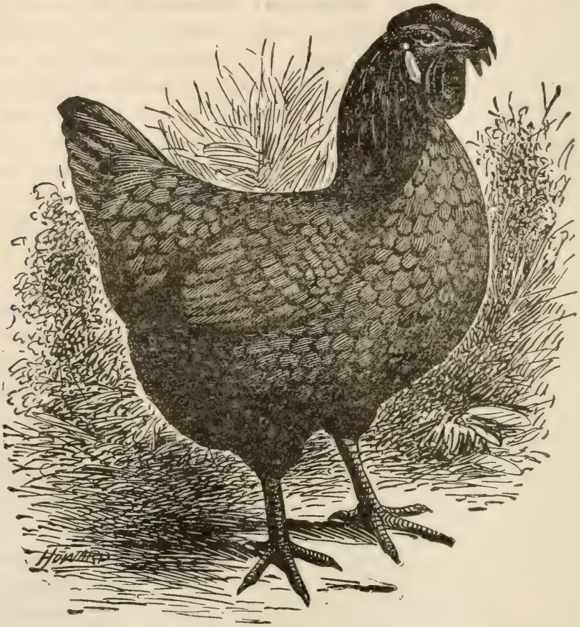


FIG. 25.—Blue Andalusian hen.

For farm purposes they rank with the Leghorn and the Minorca, the preference being only in the color of their plumage. For fancy purposes they are an ideal bird on account of their beauty. Their general characteristics are those of the Leghorn. The hackle and saddle feathers are dark blue, approaching black; breast a lighter shade of blue, each feather having a well-defined lacing of a darker shade; body and fluff, similar in color to breast, but somewhat darker; primaries, light blue; secondaries and wing coverts, dark blue; wing bows, darker blue, approaching black; tail and sickle feathers, dark blue, approaching black; shanks and toes, slaty blue.

No standard weight is given for Andalusians; their average size is that of the Leghorn.

BLACK SPANISH.

The Black Spanish fowls (fig. 26) constitute one of the oldest varieties of domestic poultry. Their name has been identified with the industry for hundreds of years, and their practical worth on the farm has long been recognized. Their haughty bearing, large red comb and wattles, and the white face and lobes peculiar too the breed, contrasting with their glossy black plumage, render them most striking birds.

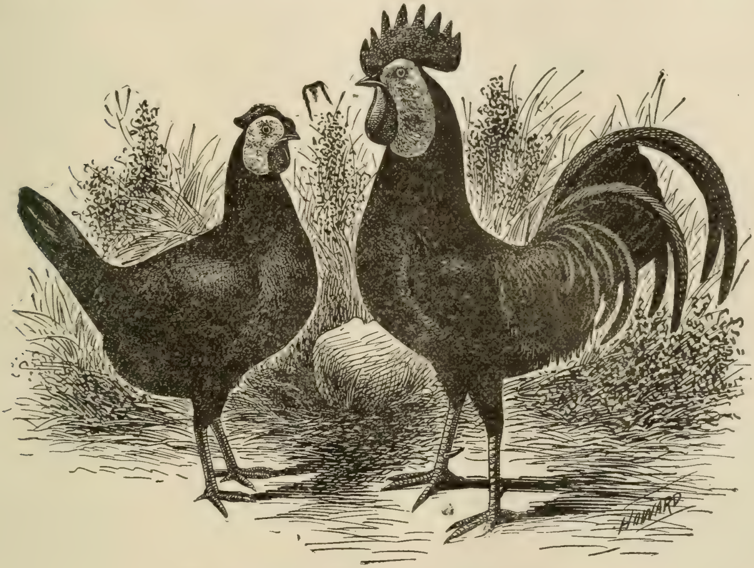


FIG. 26.—Pair of White-faced Black Spanish.

White-faced Black Spanish have long been favorably known for their exceptionally fine laying qualities. The oldest of the nonsitting varieties, they still maintain an unsurpassed record. The pullets are early layers, averaging one hundred and fifty to one hundred and eighty eggs per year; the hens begin somewhat later, after molting, but compensate for any loss in number by the increased size of the eggs. Hens and pullets are large and white and of good flavor. The white face is a distinguishing feature, and should be long, smooth, free from wrinkles, rising well over the eyes in an arched form, extending toward the back of the head and to the base of the beak, covering the cheeks and joining the wattles and ear lobes; the greater the depth of surface the better. It should be pure white in color. The color of plumage throughout is rich, glossy black, and any gray is considered a serious defect. Shanks and toes are blue, or dark leaden blue. Comb is single and bright red in color; wattles, bright red, except the inside of the upper part, which is white; ear lobes, pure white.

No standard weight is given for Black Spanish; they equal in size the Leghorns and Andalusians.

“16 TO 1,” “6 TO 1” AND THE EGG PRODUCING HEN.

‘16 to 1”—She eats 16 Times her Weight in the Year. “6 to 1”—Her Eggs in the Year are 6 Times her own Weight. “16 to 1”—Her Eggs bring 16 Cents per Pound; her Food Costs 1 Cent per Pound. “6 to 1”—Her Yearly Egg Product is Worth 6 Times the Cost of her Food.

Bulletin Missouri State Board of Agriculture.

T. E. ORR,
Secretary of the American Poultry Association, Beaver, Pennsylvania.

With my topic thus outlined no one will accuse me of talking politics or of discussing the relation of gold to silver; but the above is my text and I'm going to preach the “Gospel of Hen” and discuss the relation of feed to eggs, and how to turn our farm products into cash at a good profit.

In doing this I shall try to give you an outline of the food supply necessary for carrying a flock of forty-five pullets one year and give the average cost of these foods and tell something of the relation they should bear to each other.

WHERE AND HOW OBTAINED.

A glance at the table found in this article shows that of the ten foods outlined six are found on nearly every farm. On most farms the other four must be purchased. But even if you are a villager and must purchase them all; you are simply carrying your merchandizing a little further than does the farmer, and the farmer and egg producer must both remember that if they are to succeed in this twentieth century they must be both merchants and manufacturers. As a merchant the farmer must buy his necessities for business at the lowest possible cost and then sell them in a somewhat different form at the highest obtainable price. As a manufacturer he is constantly converting the raw material into the finished product.

THREE COMMENTS ON OUR FOOD TABLE.

First. The foods are very largely cereal. I am a firm believer in the theory that the hen can subsist and yield a fine profit in eggs on a ration of grains alone. I have no objection to soft feed, cooked feed, steamed feed, etc., but it has been shown that these are not necessary to profitable egg production. You can probably increase the egg output for a short time by these expedients, but your yearly product will, we believe, not greatly exceed that from a grain and meat ration. By cooked or steamed feed you can surely increase the egg product at the time of year that eggs sell for the most money.

Second. I give this table of foods, not as the best one for all, but as a good one for most people, especially the amateur. If your market, location and surroundings enable you to substitute potatoes, turnips, beets, cabbage, etc., for some of the items, well and good; I have no quarrel with you and shall be glad to hear of your success. Or if you can obtain fresh bones from the butcher and will grind them, you can dispense with much of the cut-bone and beef-scrap I have prescribed and reduce materially the cost.

Third. You may not be able to purchase in small quantities the feeds I have prescribed at the prices named. Feed promises to be cheap this year and eggs will surely be high. This article is written in western Missouri, and a prominent stock feeder in looking over the table said: "You have those grain prices 50 per cent higher than is necessary for this section this year." Now, you may need to pay higher prices than those specified, but if so you are in a locality where you can sell your eggs higher than "16 cents per pound." At our Beaver Hill farm we believe that our feeds cost us perhaps 25 per cent higher than our estimate, but we will realize more than 25 per cent advance on the price of eggs, for at no time this summer did we sell eggs lower than 20 cents per dozen, and in September people were coaxing for our eggs at 24 cents per dozen, or "16 cents per pound." Right here in the country districts of western Missouri eggs are selling now for 18 cents per dozen.

THE PRACTICAL APPLICATION.

The problem I am asking you to demonstrate is the possibility of starting November 1st with forty-five pure-bred pullets of an "eggs-early-and-often" strain and on the rations I prescribe, or one of equal cost and merit, make them produce in 360 days 240 eggs each, "two eggs each three days."

CAN IT BE DONE?

There are many to rise and cry: "That's all theory; it can't be done." Well, such people are the ones who will also say "A hen can't possibly consume sixteen times her own weight in one year, no more than she can lay six times her weight of eggs in a year." Well, I'm not afraid of a calamity howler nor of the man who continually decries the theories of others but has no good practices of his own to present. Nearly twenty years ago the writer of this article experimented for a full year with one pen each of Brown Leghorns, Silver Wyandottes and Barred Plymouth Rocks. Our surroundings were very unfavorable, but those hens gave us then a product of 184 eggs, 172 eggs and 160 eggs per hen, in the order named, and convinced us that the hen to lay "two eggs every three days" was a coming reality. In 1890-91 we conducted an experiment with several different breeds, and the variety that stood second in our first test stood first this time, with 202 eggs to the credit of each hen.

MANY HAVE DONE IT.

In 1893 the writer of this article conducted an experiment participated in by 230 people. There were a few pens of grade and cross bred pullets, but most of them were pure bred and of the standard varieties. Twenty different breeds were entered and ten different states were represented. One hundred and forty-three of these pens continued in the contest for the entire year and sent in their weekly and monthly reports on blanks furnished them. Many of these reports were verified by credible witnesses and attested by affidavits. Of these 143 full-year pen the twenty leading pens produced each an average of more than 200 eggs per hen, and the average of the total of these twenty pens was 240 eggs per hen.

When the above contest was started there were some poultry papers that predicted failure and disaster but after it was completed in all its details their comment was favorable and several of the leading poultry journals devoted pages to publishing its particulars. Its results have been accepted as accurate and it has demonstrated clearly the ability of hens of several varieties to do just what we are urging you in this article to allow and help them to accomplish, namely: to produce 240 eggs per year of an average weight of two ounces, a total of thirty pounds, or six times the weight of the pullet at starting.

A UNIFORM EGG PRICE.

In the experiment above referred to the number and weight of the eggs were reported to us and we fixed the price by the average retail prices of eggs in Pittsburg for that month. The average price that year was 1.8 cents per egg, but prices were lower then than they have ever been since, so in our calculation in this article we are fixing the price at 2 cents per egg, or 16 cents per pound for two-ounce eggs, and as prices are sure to average considerably higher this year, we feel that we have taken a conservative position, both on the price of feed and on the price of eggs. A product of 240 eggs at 2 cents each gives an annual income of $4.80 per hen. In the above named experiment one pen reached an income of $5.02 per head at 1.8 cents per egg. So we are quite below the leading pen in our estimate for you, even at the advanced price.

LOW COST OF PRODUCTION.

We are now down to the question: Can we feed the hen on 80 cents per year, so as to come within the requirements of the fourth item of our text, namely: that her yearly cost for food is only one-sixth of the value of her yearly egg product? Again referring to that large experiment we must admit that the reports of those who kept account of food-cost ranged from 83 cents to $1.60 per hen per year, the average being about $1.20; but it must also be remembered that those people were competing for prizes for highest production, and but little attention was given to cheapness. Under those circumstances one would not hesitate to feed food costing 5 cents per pound, or even more, in order to make his favorites win.

SOME OTHER EXPERIMENTS.

Some two or three years ago one of our leading agricultural papers secured statistics showing that the farm hen costs for feed from 47 to 83 cents per year, an average of about 65 cents. But two objections arise here: First, these hens ran at large quite a portion of the time and picked up much of their food; second, these hens were not kept up to the high-pressure standard necessary to secure "two eggs every three days," so did not consume nearly as much feed as must your forty-five pullets in this experiment. Two ounces of grain per day is the highest estimate we have seen given, but we are sure from our own experience and that of others, that this alone is not enough. We have, therefore, allotted to each one of your forty-five pullets, each weighing five pounds at the start, sixteen times her own weight of food, or a daily ration of three and five ninths ounces.

A RICH RATION.

Even the critic will admit that this is a pretty rich diet—much better in both quantity and quality than he feeds—and we are ready to admit that it requires a hen with a good digestive apparatus to do the work. She must have the assimilating powers of the dairy-bred Jersey or Holstein cow to reach the mark. No dung-hills need apply. No drones need undertake the management. But it has been done; it is being done; you can do it if you will supply the comforts and conveniences that Madam Hen calls for. To consume ten and two thirds ounces of food in three days and give you in return four ounces of egg is no small undertaking on her part, nor is it a small business on your part to secure it.

Remember one point just here: two thirds of the egg is water. The remaining one third you must give her in the proper solid foods, not forgetting the water, and also provide liberally at the same time for her animal heat, the wear and tear of her system and for the ashes of her animal fires. In other words, you must expect lots of your feed to find its way to the dropping-board, but even there it is a valuable product which we have not figured in.

COMMENTS ON THE FOODS.

A few words about these foods in the order named in our table:

Corn. We use it in smaller proportion than here specified, partly because with us in western Pennsylvania it is very expensive, but more because it is too fattening. Our hens are kept for breeding as well as for egg production. The fat hen may be kept so and be made to lay eggs up to our requirements of "two eggs in three days," but the eggs from a fat hen do not hatch well.

Oats. We consider oats our very best feed. Oats cost us 2 1-3 cents per pound the past season, but they are cheaper now. With an abundance of grit there is no danger in feeding whole oats. We bought hulled oats the past year for the same price as the whole oats. Fed alone, they are not satisfying to the hens. They do not furnish bulk enough.

Hulled oats must be accompanied with plenty of clover and other coarse food.

Wheat. At 80 cents per bushel the past season wheat was our cheapest feed. Don't think to economize by buying poor wheat or screenings. If you buy, buy the best quality obtainable.

Kaffir Corn and Sorghum. These are two of the very best of grains, as nearly a balanced ration for the fowls as you can get; but don't depend on these or any other one grain. You must keep up the hen's appetite with variety. Skip from one grain to another freqeuntly. Keep her happy and busy. It pays.

Bran. We esteem bran ,as the one essential ground food. We use it dry, in large flat boxes about the yards, where the girds run and can jump in and pick a lot of it. We also use it as a basis of all our soft feeds, a carrier for our meat-meal, etc. We always use salt on our soft feeds. Bran is rich in protein; it is a good regulator; it seems to neutralize poisons.

Clover. .I take great care in harvesting my clover for poultry, both the first and second crop. It should be cut in good time, cured nicely without dew or rain on it, and may be stored in gunny sacks or otherwise until it is needed. We run it through the cutter and then wet or steam it over night, then add bran, meat, bone, salt, etc. Do not skimp the clover. Better waste some rather than that the hens should not have enough.

Alfalfa is the only forage plant that approaches clover as "hen hay."

Meat. The egg is rich in albumen. You must feed it into your hens or the eggs will be few in number and the whites will be thin and watery. Granulated beef-scrap and the meat meal and dried blood are obtainable on the market. If you have an abundance of butcher-shop bones, and can obtain cheap meat to boil, thickening the soup with bran and vegetables, you are to be congratulated, provided you do this work regularly.

Grit. This is the most essential grain feed. Without it your own is of little good and your hens soon die of disease.

Use mica grit, pearl grit, gravel grit, cinder grit, any old grit, and, still better, all of them. Waste some grit to be sure you get enough grit.

Shell. One tenth of the shell is lime. Your egg shells must be heavy if you would hold a choice market. You can well afford to buy oyster shell at 75 cents per hundred pounds if you sell it at sixteen cents per pound, and that is what you do in the egg business.

Bone. Every one admits that the growing animal requires bone-building material to give him strength of limb. Many, however, imagine that the hen old enough to lay eggs no longer needs this kind of supply. The hen, however, is the best judge, and the eagerness with which the laying hen will turn even from grain to pick up fresh cut bone or even dry bones, is the best evidence that she needs it in her business. Do not deny her this.

CONCLUSIONS AND SUGGESTIONS.

Now, here is the table of rations we suggest for feeding forty-five pullets 360 days. It fills the first condition of our text in that it gives each pullet sixteen times her own weight in feed. It fills the third condition of our text in that it can be obtained in most sections of the country at a cost of one cent per pound. It also fills the fourth condition of our text in that the cost of her feed is only one sixth the value of her egg product. Do not condemn it until you have made an honest effort to realize the third condition of our text, namely: to make your pulets produce in eggs five times their own weight.

ONE YEAR'S FOOD SUPPLY FOR FORTY-FIVE PULLETS.

Three hundred pounds corn at ⅝ c. per pound	$1.87½
Six hundred pounds oats at 1 c. per pound	6.00
Four hundred pounds wheat at 1 c. per pound	4.00
Three hundred pounds kaffir corn or sorghum at ⅝ c. per pound	1.87½
Four hundred pounds bran at ¾ c. per pound	3.00
Four hundred pounds clover at ¾ c. per pound	3.00
Three hundred pounds beef-scrap, meat-meal, dried blood, etc., at 2 2-3 c. per pound	8.00
Four hundred pounds grit and fine gravel at ½ c. per pound	2.00
Three hundred pounds oyster-shell at ¾ c. per pound	2.25
Two hundred pounds cut bone at 2 c. per pound	4.00

Total, three thousand six hundred pounds, at a total cost of $36.00, an average of eighty pounds of feed per hen, at a cost of eighty cents.

SOME POULTRY EXPERIMENTS.

The following summary of the results of experiments at the Utah Experiment Station contains some interesting information.

(Bulletin No. 67, Experiment Station, Logan, Utah. James Dryden, Poultry Manager.)

SUMMARY.

1. What is the most profitable age of the hen? Two pens of Leghorns averaged 175 eggs per fowl during the first year. During the second year the same fowls averaged 132½, and during the third, 116½ eggs per fowl. The per cent profit on food was 188 the first year, 118 the second year, and 97½ the third. A test with two other pens of Leghorns gave the following results: First year, number of eggs laid, 159; second year, 119½; per cent profit on food, first year, 184; second year, 99.

2. What is the effect of exercise on egg production The results for three years are in favor of feeding grain in a box against feeding it in straw and making the hens scratch it out. One pen with all grain fed in a box averaged 147½ eggs per fowl per year for three years. A like pen having the grain fed in a litter of straw averaged 132 eggs. During the first year as pullets the results were in favor of the exercise, the pen fed in a box averaging 158 eggs per fowl, against 182 for the pen fed

in the straw. These results were secured with Leghorns. With two other pens of Leghorns, during the first year as pullets the pen with "exercise" laid 160 eggs, and the pen with "no exercise," 157 eggs. During the second year the "exercised" pen laid 119 and the "no exercise" 120, the results for the two years being practically the same for those two pens.

3. As to the effect of exercise on food consumption, the average of pens 3 and 4 for three years shows that the pen with "exercise" consumed 62.4 cents worth of food, and the pen "without exercise" 60.8. In the case of two other pens the average was 63.5 cents and 62 cents, respectively, per fowl, in favor of "no exercise."

4. During the year the Leghorns consumed an average of 62 cents worth of food per fowl. The Wyandottes consumed 81.6 cents per fowl, and two pens of Plymouth Rocks averaged 87.7 cents per fowl.

5. The Leghorns consumed during the year an average of about 75 pounds of total food or about 55 pounds of dry matter per fowl; the Wyandottes 100 pounds total food, 73 pounds dry matter, and the Plymouth Rocks about 110 pounds total food and about 80 pounds dry matter.

6. The three years' results from Leghorn pullets show an average of 162 eggs per fowl per year at a food cost of 4.6 cents per dozen. These results are not from selected or "pedigree" layers.

7. The record of weights of fowls shows that Leghorns weigh about ten per cent more during their second year than during the first year as pullets. During the third year there is practically no incease in weight.

8. The largest egg production was during the period of greatest food consumption. The smallest egg yield was when the food consumption was least. The hens attained their greatest weight immediately preceding the periods of greatest egg production. After the periods of heavy laying they showed a loss in weight.

9. Five pens of Leghorns two and three years old laid eggs averaging 1.56 pounds per dozen. Five pens of Leghorn pullets laid eggs averaging 1.37 pounds per dozen. The eggs from the pen of Wyandotte pullets averaged 1.56 pounds per dozen, and those laid by four pens of Plymouth Rock pullets averaged 1.52 pounds per dozen.

10. Eggs from different hens of the same breed varied in weight. One pen of Leghorns two years old laid eggs averaging 1.45 pounds per dozen. Two other pens of the same age, but of different strain, laid eggs averaging 1.63 pounds per dozen. The eggs from the latter two pens weighed more than those of the Plymouth Rock or Wyandotte pullets.

11. The eggs from five pens of Leghorn pullets averaged 1.44 pounds per dozen. The eggs from the same pens during the second year averaged 1.54 pounds per dozen. In other words, the size of the eggs was eight per cent greater the second year than the first.

12. A test of wheat versus corn gave results in favor of wheat for egg production.

13. In the case of Leghorn pullets the addition of dried blood to the ration considerably increases the egg yield. With Plymouth Rock

pullets no effect was noticed on the yearly record. With both, the pens having dried blood began laying earlier than the others.

14. The discarding of corn (except the little used in mash) and substituting a small quantity of sunflower seed, did not materially affect the egg yield, there being but a slight increase. Owing to the greater cost of the sunflower seed the financial results were in favor of the corn.

15. The results of a test with Leghorn pullets showed that a nutritive ratio of 1:4.95 was very much superior to one of 1:6.66. With Plymouth Rocks the results were inconclusive.

16. An initial test with one cockerel and one capon gave no indication of increased growth from the operation of caponizing; but the appearance of the dressed bird and the quality of the meat showed a decided advantage from the operation.

PURE BLOODED FOWLS VS. MONGRELS.

Mattie Webster in Twentieth Century Farmer.

Not long since I was asked, "What superior qualities do pure-blooded fowls possess that make them preferable to common poultry?" This question was asked by a farmer, and, judging from his conversation, he has made a success of his calling. Not only has the sowing, reaping and marketing of his grain been the source of his large income, but his fine stock—cattle, swine and sheep—have very considerably swelled his bank account. He does not doubt the greatest profitableness of pure-blooded cattle, hogs or sheep, or ask wherein are their points of excellence, but the farm poultry is of so little importance that the thought of an improved breed has never been entertained.

There are many reasons why pure-blooded fowls are to be preferred to mongrel or scrub stock, and as "the best is none too good," it is to the farm breeder's interest to acquaint himself, or herself, with the comparative qualities of the more desirable breeds, and when convinced of the greater excellence of pure-blooded poultry, dispose of the present flock of scrub stock and replace them with some particular breed or variety of fowls that is thought to be the most suitable for the farm.

In farming, as in every other business, the greatest possible profit is the object that stimulates to untiring effort, and as the farm poultry, with proper care and management, are more profitable than any other adjunct of the farm, with same amount invested, they should receive their share of consideration and attention. The best breed for the farmer is some general purpose breed, and a good strain of pure-blooded fowls will be far more profitable as layers than the usual farm stock of deteriorated mongrels or scrubs; are incomparably more desirable for market purposes than the small, thin-bodied mixed birds; are more tame and docile to handle and manage, and last, but not least, favorable quality, is their beauty.

One could hardly believe that persons who appear intelligent in most matters pertaining to the farm and farming, would have such erroneous and oftentimes absurd impressions and ideas of pure-blooded poultry and their usefulness, or rather worthlessness, on the farm, unless convinced of it by personal conversation.

I have had parties argue with me that scrub or "common" hens were very much better layers than thoroughbred hens. Then I have been told that the pure-blooded birds were not so vigorous, more subject to disease, and a greater per cent of them died during the year than the poultry that boasted no "blue blood" or aristocratic breeding. I have heard it asserted that thoroughbred fowls required more care and attention than common stock and were much more difficult to raise to maturity.

Such statements as those cited are made through lack of experience with a pure-blooded breed and therefore through absolute ignorance of their qualities and characteristics. I have had experience with the scrub stock and also with the much-to-be-preferred thoroughbred, and the latter are so much more profitable and desirable than the former that they should not be spoken of as belonging to the same family with them.

The greater profit realized from the more prolific thoroughbreds, the eggs so much larger in size and the large, plump carcass when dressed ready for market, should, all combined, I think persuade any breeder to choose them in preference to a flock of mongrels. As to the vigor and healthfulness of pure-bloods I have never had any cause to complain, having found them less subject to disease than common fowls.

As to requiring more care and attention than mongrels, this is another mistaken idea. I will admit, though, that if as sadly neglected and left to "scratch for a living" and allowed to remain homeless and houseless through sun and storm alike, as so many farm flocks are, very little profit would be realized from a flock of thoroughbreds, even if of the most noted egg-producing strain. Neither would pure-bloods under such conditions remain in health and vigor. Scrub or mongrel stock, if cared for aright, will be found to be far more profitable than is the average farm flock.

Then, how much more to be admired is a flock every specimen of which is of the same form and color—as much alike as "peas in the pod"—than one where the birds are of every color and more like quails than chickens in size. If a flock of such pure-blooded fowls is to be coveted, why not, my farmer friend, have them? It is possible for every farm breeder to have a flock that will in their beauty and profitableness be the admiration and envy of all beholders. So why be satisfied with inferior, unprofitable poultry when the best is easily attainable?

Belmont, Wisconsin.

FARM POULTRY IN WINTER.

Gallus Bankiva, in Breeders' Gazette.

There is no good reason why the average farmer should be compelled to go without fresh eggs from his own flock of fowls during the winter months, although undoubtedly he does so. No man is in a better position to so keep his hens that they will lay in winter than the farmer, but it is to be feared the average farmer looks upon his fowls as more of a necessary nuisance than as a source of revenue. This being his view, he does not give them the care they should have if they are to produce eggs during the months when they are highest in price, because scarcest in number.

Without going into the question of breeds it may safely be said that proper housing and proper feeding will induce any flock of hens to produce eggs enough to pay much more than their way during the months when they do not as a rule pay anything to their owner. Most farmers produce on their own farms everything necessary to promote the production of eggs. The very best single grain we have for laying hens is corn, but if this is made the exclusive feed the number of eggs produced will be small. Wheat and oats are both good feeds to promote egg-production and a ration composed of one fourth corn, one half wheat and one fourth oats makes a very satisfactory feed for the whole grain part of the ration. If to this is added a feed of bran or shorts, mixed with hot water so as to make a crumbly mass for the morning feed the grain part of the feed will be complete. To the grain should be added cooked vegetables of some kind. It does not matter what vegetables are used. Potatoes, turnips, beets, cabbage, apples or any other vegetable feeds that may be at hand are greedily eaten by fowls and help to promote egg-production. These vegetables may be cooked and mixed with the bran mash, the whole being salted about as it would be for our own consumption, for laying hens, and in fact all fowls, need salt as much as does other farm stock. To these feeds should be added milk or meat. Milk, while not a perfect substitute for meat, is a good egg-food, and it does not matter in what form it is fed. It may be sweet or sour, and buttermilk is fully as valuable for this purpose as skimmilk.

Meat is the best egg-food that can be given hens during the winter when insects and worms are not to be found, and this is sold in the shape of beef-scrap or beef-meal at a price that makes it a very cheap feed for the flock of laying hens. Given the above feedstuffs and sharp grit or gravel and water in plentiful supply, hens will lay at any time in the year if they are kept comfortably housed.

It is easy to find formulas for mixing feeds for hens, but after an experience of years I believe results will bear me out in saying that the greater the variety of feeds given to laying hens the better they will produce. Sorghum seed, millet, broom corn seed, Kaffir corn and the seeds from the litter taken from the barn floor are all good poultry feeds.

So much has been said in the past about over-feeding laying hens that a good many people actually starve their flocks until their powers of production are destroyed. It is entirely possible to over-feed hens that are deprived of their liberty and kept where all they have to do is to eat and then sit around waiting for the next feeding time. It should be remembered that the hen is naturally an active being and delights in working for her living, and in this she should be indulged. All grain feed should be scattered in straw or other similar material and the hens allowed to dig it out. The busy hen never gets too fat to become non-productive. This is one of the secrets of successful egg-production. The exercise obtained when a hen is permitted to indulge her natural desire to scratch for her living keeps her in the vigorous condition that is most conducive to the highest production of eggs.

A warm house is necessary to the winter production of eggs. It should be remembered that a house that would seem quite cold to a man is warm enough for a hen to live in with perfect comfort. The blood of a man has a temperature of 98.6 degrees Fahrenheit, while that of a hen is 103 degrees Fahrenheit. Here is a difference of more than four degrees to begin with, in the hen's favor, and her feathers are the warmest material she could have for clothing. These advantages give her a capacity to endure temperature without inconvenience that would make a man suffer.

The poultry-house need not be elaborate in material or construction, but it should be tight enough to exclude the free circulation of air—tight enough to prevent draughts, for these are the source from which colds, catarrh, croup and similar diseases arise. There are but few farms in the country where there is not waste lumber enough to build a comfortable poultry-house for fifty hens. In New York State the other day I saw some poultry-houses built of old fence boards in which were kept last winter a very nice flock of fowls, and their owner assured me his hens laid all winter. Given a tight poultry-house filled with fowls, and it will require a very cold night to lower the inside temperature below the point of comfort, for the animal heat from the bodies of the fowls will maintain the temperature at a point where the room will be perfectly comfortable.

Fowls should be allowed to run out of doors all the time except during stormy or extremely cold weather. I have found it perfectly safe to allow laying hens to run out at any time when the temperature was not below 18 or 20 degrees. At the same time, if the house is roomy, it is perfectly safe to keep the flock confined for a week at a time if the weather is severe. All that is necessary is to cover the floor with straw and throw the grain feed into it and let the fowls dig it out.

The poultry-house should be well lighted, for light is almost as necessary as warmth to the laying hen. I have in mind a poultry-house which is lighted from a large window in which common sheeting is used in the place of glass, and the owner tells me that he believes the sheeting the better of the two materials, because the cloth allows the air to filter in without making a draught, and both light and ventilation are furnished by the same window. Good farmers do not hesitate to furnish their farm stock with perfectly comfortable quarters, and there is as much profit in furnishing the hens with a warm house as there is in caring for cattle, hogs or sheep in this way.

Poultry is assuming an important place in the list of farm industries, and the farmer who does not make his poultry pay him a large percentage of profit is not living up to his opportunities.

In this respect our British cousins are ahead of us, for the English farmer sees to it that his poultry has as regular and as good care as any other stock on the farm. American farmers will do well to take pattern after farmers over the water in this respect.

RAISING TURKEYS.

Mrs. Emma Qua, in Farmers' Tribune.

Turkeys are not so very hard to raise after one has found out the "know how," experience being the best teacher. The first three weeks being the most critical time of their lives, one should use great care in handling them, but after that age they are usually hardy enough to get along with but little extra care. The eggs of old turkeys are by far the best to set, because turkeys that are raised from them are stronger and have more vitality. Young turkeys make the best mothers, being more domestic in their habits. Turkey eggs require 28 days for hatching, and should be seen to promptly. Remove the shells from the nest several times during the day; also see that the little turkeys are not smothered in nest. Should there be too many for comfort, remove a few of them, keeping them nicely covered and warm. Always leave them in the nest until one day old, at least, as they are very weak for some time after hatching and should not be handled. The first day give each a grain of black pepper, putting it in their mouths. This will warm and strengthen them. Do not let them out on the ground, but keep them on a board 'till about three weeks old. A large dry goods box could be used that would make a good coop to keep them in. Have a shallow dish outside for water to drink. Keep an old pan with ashes in it for them to dust themselves. Accustom them to come to their box each night after they have had their freedom. This is easily done by feeding them there. When three weeks old they will be able to follow their mother, but house them each night and during storms. Do not let them out too early in the morning. It is not necessary during a shower to get dripping wet yourself to get them in. Their mother will, under ordinary circumstances, do that better than you can. Turkeys begin to lay eggs about the middle of March, or first of April, laying twenty or more aggs for a setting. Then set the Turkey. Seventeen eggs are about the right number for an ordinary turkey (a hen will cover eleven eggs). Put the remainder under hens, having them all hatch at the same time, so that the young turkey chicks can be taken from hens and given to the turkey to raise. After a few days your other turkeys will lay another setting of eggs. In feeding, give at first hard boiled eggs with bread moistened with milk, not too wet, and freshly prepared at each feeding. It is quite a scheme to begin saving bread for them during the long winter, when so little is eaten. You may have a friend or so in town who is interested in your turkeys, who will be glad to save you pieces of bread, and in return invite the party to come and help eat a turkey on Thanksgiving. Have each piece of bread thoroughly dried by placing in oven; then drop it in a cotton bag, as paper gathers moisture, which will cause it to mold. Should you have a baking which did not quite come up to the mark, slice this up and dry. This will keep a long time, and one can with but little trouble have enough to start quite a flock. Have a place for them to roost, and get them on it as young as you can; even should they fall off, put them up again. Do not feed too often—five times a day when young. Put their feed on board, or clean plate, and keep clean. Look out for lice when about four weeks old. These will be found on top of wings in large feathers. Take a little kerosene in a dish, and with a feather slightly brush each one. Care should be taken to use but very little oil. Never put kerosene on eggs. Should they become lousy before hatching, remove eggs carefully to clean nest, putting insect powder on the turkey. Sulphur is also good. Turkeys are great foragers, and will pick up their living. To fatten, boil pumpkin and stir thick with corn meal; feed this very hot, as turkeys do not like it cold. They are as dainty as some hired men. Do not feed too much corn, or begin to fatten 'till four weeks before killing. It is said turkeys and turnips never begin to grow until frost comes. Should they steal their nests, or lay where you do not want them to set, you can easily move them to a better place. Get their new nest where you want it, and after dark move the turkey, after which keep her shut up for a few days, and she will set every time just where you put her. Always be kind to them when setting, stroking them with your hand, and when hatching time comes, they can be easily handled without any trouble. Once I saw a lady who was pounding a turkey, that was hatching a brood, with a board. Of course the turkey resented such treatment, and the lady thought she was cross.

TOULOUSE GEESE.

Mrs. J. H. Shurtleff, in Farmers' Tribune.

Having read with interest a few articles in *The Farmer* about Toulouse geese, I wish to give a little of my experience with them.

A few years ago I bought my first pair. During the first season the goose laid thirty-two eggs; twenty-five before wanting to sit. I did not let her sit. After a short rest, she laid seven more. I think this a remarkable record for a young goose, as eighteen is considered a good average. A large per cent of the eggs were fertile. From this pair I have raised a nice flock every summer. Did not raise so many the first season, for I did not understand very much about hatching and caring for goslings. I made a large pair of pillows the first season. Have had geese for five years, and during that time have made several pairs of pillows, two large feather beds, and am about ready to make the third, besides selling every season several full feathered birds. If spring opens early I pick the old ones three times during the summer, the young ones twice. The cost of feeding the young flock through the summer is comparatively nothing, as they are such good foragers. If they have plenty of pasture they will get their own living after they are three weeks old. I begin feeding sweet milk with a little corn meal added for the first few days. After that corn meal moistened with water until they are three weeks old.

I set the eggs under hens, as they are less care, a goose being more apt to break eggs and trample the little ones. Have set geese with good success. For hens I take an orange box, lay it on the side, with a three-inch strip at the bottom so the hen can step in and out without jumping down on the eggs, fill the box with damp dirt to within an inch of the top of the strip, with just enough chaff to cover the dirt, hollowing out a little to shape the nest. For geese I take an apple or salt barrel, nail all the staves but four or five to the hoops, saw the hoops and remove the loose staves, lay the barrel on the open side, pressing it into the dirt so it will not roll. Hollow the earth a little and put in a dry litter to make a nest; not too much for the eggs will get covered up. Seven eggs for a hen; fifteen for a goose. By using hens I can keep the geese laying. When a goose wants to sit I put her in a yard where she can not get to the nest for three or four days. Then she is out of the notion of sitting and will soon lay again. A hen will take better care of the goslings than a goose. Do not let them run in the wet grass or be out in the rain, for they can not stand much wet until full feathered. Give plenty of fresh drinking water. The eggs from my flock have averaged 90 per cent fertile every season. Care should be taken not to get the breeding stock too fat during the winter as the eggs are much more fertile if the stock is thin in flesh at the beginning of the breeding season. Having one gander for two geese, my geese begin laying in March. I believe if farmers knew the value of a goose for a table fowl they would be more extensively raised. There is some objection to the goose on account of its being too fat. I remove the surplus fat before roasting, which being fried out is excellent for cooking purposes. To dress a goose, put a wash boiler containing one inch of boiling water on the stove, with a common steamer turned bottom side up, to keep the goose out of the water. Cover and let boil three or four minutes. If properly steamed, the feathers are easily removed.

I keep old geese for breeding, as they do much better than the young.

PART VIII.

PAPERS READ BEFORE FARMERS' INSTITUTES.

HOW TO IMPROVE THE INSTITUTES.

E. J. McQuatters, before Worth County Farmers' Institute.

As improvement seems to be the watchword of these times, in all lines of education, it is not impossible for us to improve our institutes. Let each succeeding one be better than the preceding one. So let us endeavor to make this session the best session we have ever seen. We must either improve or retrograde; there is no such thing as standing still, on an exact balance, neither moving one way or the other. Ten years ago last December the Farmers' Institute of Worth county was organized. It has had a steady growth, never at any time receiving a "boom"; after a "boom" there most invariably follows a depressed condition, if not a motality.

The institute system in Iowa is recognized as good. It serves as an educational factor. It is supplanting the old haphazard way of farming with a systematic, scientific method that is proving of untold value to the agricultural class of people. It was supposed at one time that the great prairies of the west were inexhaustibly fertile. As the land became old and worn it shows evidence of mistakes that the tillers have made. The farmers, knowing this, began to look about for something that would replace it. The rotation of crop has found to be of great advantage. Then as the years passed there was a growing demand for farm products, and to meet the demand the farmers' institute was introduced as a ways and means committee to see if it could devise any way to meet this increasing demand. The State of Illinois at first held congressional farmers' institutes in each congressional district for a few years. This gradually gave place to the county institute. At present there are thirty-four State and Territorial farmers' institutes, holding local county institutes. How these can be improved remains to be seen.

The methods of conducting local institutes are not the same in all states. An instructive farmers' institute should be a body of farmers by the farmers and for the farmers. The farmers as a rule do not come prepared to discuss the subjects upon the program, but expect to hear some one else talk. This is a mistake; it serves to make the work of the session drag and many get that "tired feeling" that is sure to follow.

I think it is well to place upon the program some one to open the discussion after each paper. I believe it is a mistake in preparing a paper to make it too long; let there be more time for discussion. In discussion lies the spirit of the meeting. The institutes should be made a source from which knowledge can be drawn, a stimulant to pride and respect for farming. They make known the latest discoveries in agriculture. They give the farmers of the State an opportunity to met men who have made their business a science as well as an art. They energize and fertilize local thought. It is said: "The farmers' institutes in Iowa cost less than a single cigar to each farmer in one year." To make a success of any business is to do it well; usually, that is all that is necessary.

The program of our institute has not varied a great deal in the last few years, therefore, in order to make any improvements it might be necessary to do a little experimenting. We have been holding a two days' session, with an evening session, conducted by the county superintendent of schools,. This has been a drawing factor, for we usually have a crowed house and an instructive program. I think this plan a good one, and have no suggestions to give as to its improvement. I am sure it would be an improvement to have the farmers' wives at our meetings. We usually succeed in getting one or two ladies' names upon our program. I presume the reason they do not attend is because the subjects oftentimes are not interesting to them, and such that they do not care to take part in the discussion. Now I think it would be well to have a three days' session, and give one day to the ladies; let it be called the "Women's Session." Let these days be Thursday, Friday and Saturday. Let the ladies have Saturday for their session, as that will perhaps give them a better chance to leave home. The older children of the family would be at home from school that day to take care of the little folks, who do not care to attend the institute. Let the ladies conduct their own session, choose their own president and their own secretary. If possible, have a professor of domestic economy to be with us that afternoon. Have a committee of ladies prepare their program, and have it published with the regular program; this would give them a chance to choose such questions as would be of interest to them. There are many questions in domestic economy that interest the "sterner half" as well as the "fairer half" upon the farm. For instance, he likes good bread, and he wants his wife or the hired girl to know how to make it with the least possible waste. There are many household duties that are perplexing at times to the average housewife, many of which might be overcome or made light by having a woman's session at our institute. This has been tried in other counties of our State and has proven a great success. Shall we try it?

In setting the dates of our institute it is a good plan, if possible, to set them at about full moon, or, as our ancestors would say, "set them in the moon." For our evening session this would be more pleasant, for the young people find it more convenient to drive by moonlight, and the older ones surely would not object to this privilege.

Perhaps it would be an improvement to place a young lady or two from certain townships on our program, giving them the subject of "Neat Housekeeping." All the boys from the township would be sure to come to hear that paper. It certainly would be an improvement if some of our progressive farmers would write an article occasionally for our local papers, expressing their views upon certain subjects in which they are interested, thereby interesting others upon the same line of work, or upon different lines of institute work.

To prepare a program that is satisfactory to a majority of our farmers is no easy task. It would be a great aid and perhaps an improvement upon the present plan, if many who are interested in institute work would send to the secretary before the time of preparing the program any questions they would like to discuss or hear discussed. As it is the make-up of the program is usually left to the officers and is looked upon as an official duty. But this is your institute, farmers, and we want your hearty co-operation along all lines of the work.

SHOULD FARMERS ORGANIZE?

Hon. Chris Marti before Scott County Farmers' Institute.

The question allotted to me, "Should the Farmers Organize?" has been discussed time and time again. The voice of the organizer has been heard in almost every schoolhouse and public hall in our rural districts. Organizations have been called into existence here and there, such as "the grange" and "farmers' alliance." Both have done some good work in their time, but their life, generally speaking, was short, and great results could not be exepected. But today new conditions confront the farmers of the country, because as civilization comes creeping down through the ages new forces are being discovered almost daily, and within the last few years the industrial world has been revolutionized through the force of combination, both in capital and labor. The new forces have been well exemplified, and have you noticed how quickly one follows the other? Not from choice, but necessity. And while the invading army of organized capital and labor confronts the farmers of the country with problems and possibilities which in the end may prove very unfair for us, because I believe that unfairness has already been clearly demonstrated during the past year in our live stock market.

In fact, we have reason to believe that competition, the very essence and life of trade, is a thing of the past, and that prices are agreed upon and fixed by that combination known as the packers.

And the chasm between the producer and consumer is widening day by day. This organized power fixes the price of everything it sells and arbitrarily fixes the price of everything it buys; and like the elder Napoleon, whose ambition was to control the whole world, this organized power already controls this far-famed country of ours and is in a fair way to control the whole world in meats.

FARMERS LOSE ON BEEF.

And I venture to say that one half of the consumers of our pork and beef are entirely ignorant of the fact that the high priced meat they consume is prepared by the farmers at an actual loss at the present price of live stock.

Then, Mr. President, the price of every implement which we have to buy to use on the farm from the garden hoe to the self-binder is fixed by organized power. The wages we pay is fixed indirectly by organized labor, so everything we sell and everything we buy is ruled by a combined price which is tightening its grip day by day.

And the farmers are like the rudderless ship on the troubled sea, not knowing where we shall drift.

And still I have no war to wage against these organizations; it means better wages, shorter hours, more comfort, more schooling for the children, which will or ought to lead to better citizenship for the laboring man.

And with organized capital it means larger dividends, greater economy in management, and last, but not least, a better system of meeting any unjust demands of other combinations.

And both organized capital and labor have come, to stay. It is the natural evolution of things. Politicians may cry out against organized capital. Political parties in their declaration of principles may denounce trusts and combines and declare in favor of laws to control them. Laws may be passed aiming in that direction, and notwithstanding all this, combination in both capital and labor has come to stay. One without the other would become its own worst enemy, and would end in decay and disruption, and while these forces are cutting a wide swath in the industrial and commercial world the greatest force and power is still undeveloped in so far as organization is concerned. The milions and millions of farm homes in this free land is an index of that power. The farmer has looked upon this industrial upheaval complacently, believing it was only a question of time when everything would be back to its old channels again and that supply and demand would rule both commerce and labor, but that thing has been exploded and in order to meet these new conditions we have but one course to follow, and that is the course the capitalist and the laboring man has pursued—power by organization. If any man fifty years ago had ventured the assertion that before the close of the nineteenth century the voice of organized labor would demand and be granted shorter hours and higher wages, society would have cast him out as a lunatic. And the same is true of organized capital. Think for a moment of the possibilities of the farmers from a financial standpoint. Take Secretary Wilson's figures of exports and imports for the year 1902, leaving out farm products, and we have an adverse balance of sixty-two millions, but when we include farm products there is a balance in our favor of two hundred and seventy-five millions—and in 1903 the adverse balance is sixty-five millions and including farm products three hundred and seventy-six millions in our favor.

CO-OPERATION.

Lewis Richards, before Winnebago County Farmers' Institute.

To co-operate is to work together. Co-operation is found only where all who may be connected with or interested in a certain work or purpose labor together for the general advancement of that work or the accomplishment of that purpose, not where the members of each consider the welfare of its members without any thought of the general good.

Such efforts on the part of classes or departments, though sometimes called co-operation, is combination, and results only in class or race prejudice.

Co-operation in the creamery business or dairy industry is where all concerned work together for the advancement of the creamery and dairy business of that community; not where the creamery owners co-operate for the good of creamery men, the butter-makers for the benefit of their profession, nor where the producers combine for themselves as against all others.

There is a vast different between co-operation and combination. Combination suggests an agreement, prompted by selfishness to advance the interest of the individual. Co-operation suggests an agreement prompted by a spirit of fraternity and good will to advance the interests of all. As I look at the two words, combination should be prohibited or restricted by law, but co-operation should at all times be encouraged. There should be co-operation between capital and labor, between employer and employe.

A railroad should be managed in the interests of its stockholders, its employes and its patrons, and not for any one of these classes against the others.

The creamery business should be managed in the interest of the owners, the employes and patrons. The butter-makers, haulers and patrons should all be interested with the manager in building up and maintaining the business and improving the quality of the product.

Let me refer you to articles sometimes written in papers and to men living in your own cummunity who have adopted the unamerican policy of condemning the character and questioning the integrity of all capitalists and business men. They condemn even the Supreme Court of our land, the President of this great commonwealth, and the Congress of the United States, they would have us believe, is made of boodlers and enemies of the common people.

These influences have led some people to believe that the business men, and especially creamery managers, are making all the money, and that to protect themselves they must buy hand separators and ship their cream from fifty to two hundred miles away from home, where they do not know the manager and have no means of finding out the financial standing of the company to which they consign their product, and then send their cash to Chicago or Minneapolis to some mail order house in order to protect themselves from being swindled by some local establishment that has come into the community to help them pay taxes.

Now I have had thirteen years' experience in operating creameries, and during this time I have not been altogether ignorant of the success or failure of my neighbors in my own and adjoining counties. Believing I know the facts, I will say that very few individual creameries make money. I will venture the opinion that the majority of managers of farmers' creameries are not sorry when they are not re-elected.

The individual creamery is not an enemy to the dairy industry. It was the individual creamery that put the idea into the heads of farmers that they could build and operate creameries.

Then where there are individual creameries, well and good, let the farmers co-operate with them as fully as possible. But where there are farmers' creameries, let the farmers co-operate and work for the advancement of their own industry and not ship their product past the doors of their own establishment to build up for someone else that which you need at home.

To illustrate, we will suppose that the patrons of a co-operative creamery are not fully satisfied. Perhaps strong competition has cut up the territory and increased the expense of operating and lowered the quality of the product. That is what too much competition does. Now, if the partons of such a creamery wish to improve conditions and increase their profits, do not look for a new creamery or some place to ship your cream, but come together, and get all who are naturally tributary to that creamery to meet with the manager. If they will then agree with the manager and each other that they will stick together and to that creamery, and that they will do all in their power to improve the quality of the product and in all just ways will promote the good of that particular creamery, I think the chances are sixteen to one that the manager will be willing to give to them every benefit that they can secure to a creamery through such co-operation.

However, some men may be the one and not the sixteen, and may not wish to co-operate with his patrons. Then I think the sooner he gets out of the business the better, and the next best plan is to give your support to one who will. But co-operate on the principals of co-operation.

That man is said to be a public benefactor who causes two blades of grass to grow where there was but one. It is equally true in creamery economics and co-operation that a man is a curse to any dairy community who causes a second creamery to be built where there is but territory to support one. True economy consists in using to the best advantage that which we already have, and where the spirit of co-operation comes in a community, let it be co-operation and not combination.

And, after all, what are the benefits of co-operation? In the fable the old man wanted to impress on his sons the value of their co-operation, and demonstrated it by tying sticks together in a bundle and bidding them to break it, which they could not do. Then he untied it and they easily broke each stick by itself. This is the theory of the benefits of co-operation in everything; this is the theory on which our glorious nation is based.

The benefits of co-operation, then, are strength, ability to resist impositions of other interests, to carry out enterprises on a larger and more profitable scale.

Do you ever think of the practical value of co-operation as exemplified when Uncle Sam with his 70,000,000 people carries a letter from New York to San Francisco for two cents, or when co-operation among the nations carries a letter to the other side of the world for five cents?

The benefits of co-operation seem to me so plain and so often proved by practical application that there should be no more need of wasting our time.

BEE CULTURE.

C. M. Saylor before Pocahontas County Farmers' Institute.

The subject, "Bee Culture," which has been assigned me, is so large and broad a subject that we scarcely know where to begin, and when I conclude there will be only a very small part of the subject exhausted. Being in the bee business only six or seven years and not directly for profit. I say not directly for profit, I began with but one swarm, to fertilize my orchard and garden, there being apple, plum and cherry trees, also strawberry plants, that will not bear unless fertilized from other blossoms. In this my bees were eminently successful. Trees had blossomed from year to year without bearing, began bearing. What I shall say will be from the standpoint of an amateur, and not from an old, scientific beekeeper.

I sympathize with you being obliged to listen to an amateur, but after listening to the big guns for some time some of the plain, practical ideas of beekeeping will be a change at least. I do not think anyone should engage in the bee business that is not a lover of honey, for this reason, without that object in view, working among bees is very likely to become distasteful. As is well known to most of you, the bee is an animal that objects to being trifled with; the bee carrying a sword or dagger with him all the time, like a Russian soldier, and never asking permission to use it. In this connection will say that much suffering can be avoided by not taking hold of the lance or sting with thumb and finger to draw it out, but instead use a blunt knife, scraping over the part stung, which will remove the lance and with it the poison. Try it and see.

As stated before, I began with one swarm and at the end of the first season I had five heavy stands of bees and about eighty pounds of surplus honey. I made this remark: That if bees would always do as well I would sow the entire farm to bees. But in proportion they have never done so well since, but are doing well enough from year to year to continue keeping them. I think the amateur ought to begin with only a few swarms to learn the ways of the animal and ascertain if the business will be agreeable, because discouragements are sure to come, as some seasons they will scarcely make enough to winter them. The greatest enemy of the bee is the moth, which destroys them if not removed, and the only remedy I know to assist the bees in keeping the moth fly or miller out of the hives is to keep the entrance of the hives nearly closed, except in the best of honey season, which is from May 20th to September 1st, and to have hives tight so as to exclude all vermin. In the spring, just before the soft maple blossoms, every hive should be examined and cleaned, and if found weak in numbers or with a small supply of honey they should be fed at once, which will stimulate brood rearing and getting ready for the honey harvest; whereas, if left without feeding, if they do not survive it will take them half of the season to become worth having. Feeding must never be done outside the hives, as that has a tendency to start them robbing each other, which is always fatal in the apiary. Good bee feed is made of equal parts white sugar and water spread on an empty comb and placed on top of frames, leaving the honey board off while the feeding is done. A better feed is sections that are not entirely filled and unsalable, placed on top of frames. Never be afraid of feeding too much, but quit as soon as the blossoms appear. Cleanliness is one of the essentials in the apiary. House cleaning is appreciated by the bees as well as by the white folks and should be attended to the second or third warm day the bees are out flying. The best time to work at bees is from 10:30 A.M. to 2:00 P.M. on a very warm day, when most of the bees are out. Bees object to being disturbed in cool weather or at night. A bee veil and good smoker are good adjuncts in saving the bees and saving yourself from becoming nervous when the work is always improperly done. Bees will resent all quick motions or boisterous handling. In this connection will say that many swarms will be saved by having the hives sweet and clean, which is evidenced by bees very seldom leaving a clean, new hive.

A few more words in regard to wintering bees and I am through. Bees, like other animals, do better when protected in winter, at least that has been my dear bought experience. For instance, one fall I had fourteen swarms, eleven good heavy ones and three late light ones. I put the eleven into a bee house tight enough to exclude the snow, and for want of room I put the three light ones in the storm cave. In the spring matters had changed. Those in the cave were the best. Since then I have always wintered my bees in the cellar, in a room that is comparatively dry and away from vegetables. I see that the room must be entirely dark and not opened often. Every time a bee room is entered with a light or othewise the bees are disturbed and fill themselves with honey, which if persisted in, is very detrimental to their health in confinement.

FARM EXPERIMENTS.

J. C. Preston, before Ida County Farmers' Institute.

The subject assigned me is a little out of the regular order of institute topics. The idea of experimental work has generally been looked upon as simply a fad, or, at best, for some professor at our experiment station to get his name before the public, or make a demonstration for the benefit of the agricultural students. There never was such a fallacy as this. The experimental work at the State College is of value to every farmer in Iowa, even though he directly has no use for the college experiments. In fact, nearly every improvement in our method of farming and feeding can be traced, directly or indirectly, to the experimental work of the station at Ames.

But our subject is not experiment station work. You can get that in detail in the Station Bulletin. What we want to say is in regard to "Experimental Work on the Farm."

Such a demonstration as was made at the Monona County Farmers' Institute last November, by Mr. Easton, of Onawa, was of more value to the farmers of Monona county than many experiments made at the State station, because of soil and climatic conditions.

We have for years believed that to make the work of our experimental station of real, practical value to the farmers of Iowa the experiments must be made on the farms by the farmer himself, or under his supervision. This is why the recent cattle feeding experiments at the "Cook Ranch" were watched with so much interest by the cattle feeders of the State.

In like manner Professor Holden and his corn lectures at the farmers' institutes have awakened such an interest in corn growing as never was known before in the history of agriculture in Iowa.

Another step in advance is the movement recently inaugurated by the Department of Agronomy in sending out their men to procure samples of soils from the different sections of the State and analyze the same. This you see is practical experimental work and will enable the farmers to apply such fertilizers as will be of benefit to both soil and crops.

Again, the idea of getting farmers to keep tab on certain fields of corn, noting the difference in yield between spring plowing and fall plowing in the same field, this continued through a series of years will be of great value, not only to the farmers who are doing the experimenting but also to the cause of agriculture at large.

As our topic, however, is "Farm Experiments" we shall have to bring our discussion "nearer home," if we may use the expression.

To what extent shall the ordinary farmer experiment with the diffent crops, or along horticultural and forestry lines? We shall give three reasons why the ordinary farmer should conduct "farm experiments to at least a limited extent. First: To know the proper treatment his soil requires. Second: To know the kind of crops to raise. Third: To test the new kinds of seeds and plants, to know whether they are adapted to his soil and conditions. Only by such tests can the farmer intelligently plant or sow any new crop. On our own farm we have done a little experimenting. The results may be of interest to some, not because they were always successful, but because of the lessons they teach.

Our first experiment was in subsoiling a piece of prairie sod. We got the idea somehow that all that was needed to grow a crop on our virgin soil was to get a mellow seed bed. Our experiment of subsoiling prairie sod failed to produce a crop even though we gave it the best of care. Later we learned the reason why. That lesson was worth more to us in after years than many "I told you so's" would have been.

In order to find out the relative cost of production between a crop of wheat and a crop of corn careful account was kept of the two crops, only to prove that there was very little difference in the cost of producing an acre of corn and an acre of wheat, the profit being in the yield per acre and the price of the product. Running through a series of years we find that corn has stood up better and yielded more per acre on land that had been in small grain the previous year as against land that had been in corn.

In growing oats we find that in four years out of five the early oats have produced the best yield; two of the years the yield being fifteen bushels per acre more than the late or side oats produced.

For the past two years we have been experimenting with a new kind of spring wheat, claimed by the seedsmen to be "pure bred." The first year we sowed two pecks of seed, the second year four bushels. The wheat has produced a very fair berry of good color and shape, but it is not a heavy yielder. We shall try it again, however, before giving it up.

On the light soils of Ida county we have found that a better stand of clover can be secured where it is given the same covering as the small grain, and the best stand has been secured where early oats or spring wheat has been used as a nurse crop.

Alfalfa has been tried on our farm only in a very limited degree. A small piece, about three fourths of an acre, was seeded in the spring of 1902 at the rate of twenty pounds to the acre. The ground was plowed in the fall and then disked twice in the spring. The seed was sown about April 20th and harrowed in. A good stand was secured. Part of the plat was sowed on fall rye, part with oats, and part to alfalfa, without a nurse crop. The oats were mowed for hay August 1st, the rye was harvested July 8th, and the plot without the nurse crop was mowed when the oats were. The whole plot was mowed again in September. The best stand and the best growth was where the oats were sowed as a nurse crop. We sowed one half bushel of oats per acre. During the past summer we mowed three crops of alfalfa hay, but owing to the excessive rainfall we lost the first and last cuttings in curing. This experiment, however, has satisfied us that alfalfa will do well in Ida county. (We might mention here that the seed was furnished by W. S. Kelly, of Mondamin, to be tested by the farmers' institute, free of charge.) The season of 1903 was not a favorable one for experimental work, owing to the superabundance of moisture.

We bought one half bushel of "Reid's Yellow Dent Corn" from James Reid. Our aim was to test this corn on our own soil. A plot of ground was selected on creek bottom; the previous crop was rye. The ground was manured with a manure spreader, twelve four-horse loads to the acre, then plowed with a riding plow about five inches deep. On account of the heavy showers it was found necessary to disk this ground five times before planting. The corn was drilled in but the stand was not what it should have been, though the corn tested well in the house. The corn was bought in the ear and the ears averaged one pound each. After planting, the plot was harrowed frequently until the corn was up two or three inches, but during this period the heavy rains made the ground so wet that water stood on it part of the time. The plot was cultivated four times and run over with the weeder once and was kept fairly clean. The stalks made a fine growth and promised to ear well, but a local hailstorm on the sixth of August cut off nearly all the leaves and injured the stalks and silks and probably cut down the yield one half. We only got about thirty bushels per acre and only secured a limited amount of seed corn, but enough excellent seed was secured to give it a fair test next year.

As it appears to us, here is a large field of operation open for the farmers' institute. "One swallow does not make a summer," neither does one or two experiments prove this, or that. It is only by a successive series of tests on different soils and under different conditions that anything like a positive result can be obtained. This can be done through the medium of the county farmers' institute working with the individual farmer on one hand and with the Department of Agronomy on the other. A good beginning has been made by getting Professor Holden and his assistants at our institutes to show the farmers the possibilities of the corn crop of Iowa. This good work should be kept up until not only corn but every other field crop has been tested, improved and made to produce to the fullest extent of their possibilities. To this end every farmer can afford to experiment with some particular crop every year. This will not only be of value to the cause of agriculture, but the one who makes the experiments will have gained a vast amount of knowledge which to him will be valuable. It will be impossible in this short paper to enumerate all the different crops the ordinary farmer should experiment with.

Horticulture, forestry and feeding should also be included in the list, but each one of them will give material enough for another paper.

There is one experiment we would speak of before closing and that is the "weeder" in the corn field. We have given this implement a fair test for two years and have no hesitation in pronouncing it a very valuable tool in the corn field when handled right. In a dry season we would recommend the use of the "weeder" until the corn is knee high. We have found it a good plan when the ground is dry to use the "weeder" twice, then cross with a cultivator, then use the "weeder" to level down the ridges. In a wet season like last year we would reverse the proceeding—use the cultivator first and the weeder second.

In closing we would say that every farmer should test for himself his seeds, his methods, his machinery, and, in fact, all of his farming operations.

THE FARMER'S EDUCATION.

T. J. Kating, before the Jasper County Farmers' Institute.

We are more apt to place a higher value upon that which we have not, rather than that which we already possess. This trait of human nature must be my excuse today if I seem to overestimate the value of a farm education, for there is nothing I feel the need of more than a thorough knowledge of this great primary industry. I believe there is no better opportunity in any line of business than is offered in this to the intelligent, industrious young man or young woman who is willing to properly prepare himself by scientific training.

The object of education is to develop the individual, to fit him for life; to make his condition more agreeable, not only to himself but also to those with whom he comes in contact. Education is the pathway to progress. It is the crowning glory of civilization. Now, what or whom is the farmer that he needs or does not need these accomplishments? He is the man whose intellect and industry provides food for the world. His products renew the brain cell of the philosopher and gives bloom to the maiden's cheek. Without him, armies would be useless, and the wheels of industry stand still. He forms a large part of the population of an extensive community. Ought not such an important element of society be invested with all that tends to direct his energies and make his efforts more effectual?

When we review the progress which farming has made in the past century, we are gratified, but when we compare it with the wonderful achievements in other branches of industry, we must acknowledge that the farmer has not kept pace with his brethren. The productive capacity of a farmer in this country is higher than the average of Europe. It is a long way ahead of that of his grandfather, but while he has been increasing his capacity three or four fold, the miner, the manufacturer and the printer have increased their productiveness from ten to one hundred fold. Now, why is this? Simply because those other industries have received more intelligent application than has farming.

The farmer has been too passive. He has taken things too easy,—not physically, perhaps, but mentally. He has lived in a country whose broad acres were to be had for the asking. If conditions became too intense for him at any time, he had but to hitch to his "Prairie Schooner" and go to a home unmolested in the great prairies of the West. These conditions have changed, and already population has pushed to the fartherest extremity of productive land. He can "trek" no more. Nearly everywhere in the West, land measured by its commercial value has reached a common level. If new fields are opened, it must be by immense expenditure for irrigation.

With the increase in land values comes a demand for an increase in its productiveness. The great question is "how this may be accomplished?" The answer is simple. By more intelligent direction, a broader knowledge of stock, of breeds, of grains and of soil, and closer attention to details. To accomplish this we must educate.

Our manufacturing interests, especially the packing houses, where nothing goes to waste, are splendid examples of management and economy. Here the work is directed by an intelligent head and executed by competent subordinates. But, in our country, for a long time to come (we hope the time will be very long) the farming industry will be in the hands of small independent farmers, and in order to get best results he must combine knowledge with executive ability. In fact, he must possess qualifications that would fit him for success in almost any other field of human endeavor. He must know what crops are best suited to his soil, and this is better learned by chemical analysis than by long years of disappointing experiments. He must mature his products in the shortest possible time conducive to profit.

It is a well established law in the physical world that matter cannot be destroyed, but a scrub animal or an inferior plant has the capacity of storing it up so long that the returns from the investment are not profitable.

The average farmer doesn't encourage education enough. It is true he sends his children to the public schools, and most of them receive a fair knowledge of English. If the child is ambitious and wishes to attend college, he is often sent, but nearly always with the fond hope that some day he will be able to engage in a field of action other than that of his early surroundings.

Graduates of agricultural institutions would have a difficult time to engage their services to the average farmer. They would be asked how much corn they were able to husk, and whether or not they intended to spend half their time in reading. The farmer does not stop to consider that his hired man, unlike the laborer in public works, becomes for the time a member of the family and to a certain extent exerts an influence for good or bad upon it, especially the younger members. This fact alone should appeal to him in favor of the man who with his knowledge and graces of education would bring into the family an air of refinement and culture that would be a revelation to the too often discontented boy or girl who is looking impatiently forward to the time when he will be able to leave the home nest and venture into the outer world. But the chances are that the man who can pitch the most hay is preferred to the man of accomplishments. There seems still to be a prejudice against so-called "book learning." In Missouri, where one half of the people are engaged in agriculture, and where the industry is considered so important that a law has been passed requiring the elements of the science to be taught in the public schools, in this great State, whose university has more than seventeen hundred students, there are only thirty-four in the School of Agriculture, and of the forty-six graduates last year, there were but two students in this branch, while law, medicine and mining were well represented. This is not as it should be, and indicates that farming is far in the rear of other industries. The boys and girls on the farm are generally discontented as a result of improper training and treatment. The work is trying and the tools are poor. There is too little sunshine and too much gloom. John's hog is too often converted into father's money. All this discourages and tends to drive them from the farm. Our literature drives them away from their prosaic life into what they believe to be the active and ideal. They read of the office boy who advances to the head of the firm, and of the servant girl who becomes a princess. They compare this with their own monotonous routine, and dream of great things beyond the farm. Our books and magazines are filled with achievements of "Captains of Industry" but not one word is said of the privates of honest toil. We hear too much of "Money Kings" and "Social Queens," and too little of honest men and virtuous women.

Sentiment is against the farmer. His name has been the synonym for the uncouth, the uncultured, the great unwashed. He has been the subject for the comic illustrator. Tradition always pictures him among the gullible; fakirs reckon him among their sure victims, and that he is always on the outlook for a gold brick. All this exaggeration by press and public has its effect upon the sensitive boy and girl. Most of us remember when we would prefer to pull weeds at home rather than undergo the fire of the critical, mocking eyes on the village street, all too conscious of our awkward appearance. To overcome all this the farmer must assert his individuality. He must make his influence felt. By bringing into his calling a degree of culture he can command his rightful place in the social and political world.

He requires a broad scientific knowledge. He deals with plants, and must know botany. His range embraces animals; he must study natural history; he must have a knowledge of chemistry and understand the principles of business. The birds are his friends and he must perfect them. In fact, he comes in direct touch with nature, and is himself a child of nature. With all his technical knowledge he must not forget his civic duties. In our country he wields a political influence that can not be ignored. This should be directed by intelligence, for it is the only guarantee of liberty.

Having endeavored to show why the farmer should be educated, let us briefly consider the means by which this may be secured.

Missouri has made an effort to teach the elements of agriculture in the common schools. This is not enough. The public school course is already too crowded and we must not expect more than a foundation of an education to be furnished in it. No one expects law or medicine to be taught in the common school, and why should we expect a science as complex as either of these to receive the attention it requires. The agricultural press is a splendid medium for the exchange of ideas and is not to be ignored by either novice or expert. It keeps the important points fresh in the minds of the reader, and although not all it contains will be of practical benefit to every reader he can easily find what is suited to his condition.

Closely related to the press are the bulletins issued by the Department of Agriculture and by the various experiment stations. They may be had free of charge and cover a great variety of subjects pertaining to agriculture. They are prepared by experts and no more reliable information is to be found than is given in them.

Farmers' institutes are grand things. Here the farmer sees and talks with those who have had experience in their lines and are competent to impart information. This is sometimes better than learning from a book and it also cultivates a fellow-feeling. Usually the men who ought to attend are not there, but if his neighbor is present the influence will spread and many will be indirectly benefited.

Best of all is a thorough course in an agricultural institution of reputable standing. In this a broad foundation is laid and a more thorough knowledge of the principles may be gained. Besides, the student comes in contact with men whose influence will tend to cultivate a love for the farm and for farm work. In the past few years the college or Middle West have inaugurated "Short Courses" which have been attended by many farmers with profit. They go home filled with enthusiasm for better methods, and their indifferent neighbor is unconsciously and often drawn into the current of progress. No young man needs to hesitate about preparing for a life of farming. His occupation will be permanent. Railroads and steamships may give way to aerial navigations; the ingenuity of the inventor may reduce manufacturing to a very simple matter, but in spite of the chemist's fondest dreams the tiller of the soil will find ready market for his products as long as the human race hungers and man is chilled by Arctic frosts or scorched by torrid suns.

Many farmers say, "Give me the practical man," and by this he usually means one who has succeeded without apparent training other than that furnished by natural judgment. Now, what is there about education that tends to make one impractical? There are educated failures on every hand. How much greater failures would they have been without education? And who knows how much the world has lost because so-called practical men were not able to combine intelligent direction with good judgment?

In contests at our grain and stock exhibitions the trained mind invariably wins. At the last International Stock Show the Agricultural College of Nebraska took the prize on the champion steer. This animal was very much of a grade, but the exhibitors had confidence in their training and won on what the ordinary breeder would have passed by and taken a pure type instead. This fact will also answer the arguments of those who claim that these institutions have more money to spend in experiments than the average breeder. It is evident that there is more than mere dollars involved.

Our government is doing much for agriculture, but it could do more. A great stress is laid upon our gigantic totals of production. Government officials confer with the leading bankers and manufacturers in regard to proposed legislation, but the mass of farmers has no recognized standing. They do not support a lobby.

When the Roman citizen was a farmer in time of peace and a soldier in time of war that nation was prosperous and triumphant, but when captive slaves became tillers of the soil farming lost its dignity and that great nation began to decline.

It is from the half mythical history of this ancient republic that we get the story of Cincinnatus. The story seems almost too good to be true, but in these days of political ambition it is refreshing to hear anything that rebukes the spirit of the times.

The barbarians from the North had attempted an invasion and had entrapped the Roman army in a narrow mountain pass. A courier made his way back to Rome and informed the senate that help must be sent at once or the army would be lost. Terror reigned in the city. In the crisis the Fathers appealed to Cincinnatus, who hastily gathered the old men and boys together and, marching at their head, defeated the enemy. When he returned triumphant to Rome the grateful people wished to make him director, but the noble Cincinnatus declined all honors and went quietly back to his plow. Whether true or not, the story has placed the mantle of immortality upon the Roman farmer. Against the dark background of perverted political ambition the ideal Cincinnatus will stand out as a shiniog contrast for all time. Where and when will appear the modern Cincinnatus?

A new ideal of farm life is needed. One that will draw the farmer away from the past and set new standards for the future. An idea that will tend to cultivate the brain as well as to increase the bank account. The farmer must learn to measure life, not only by its length but also by its breadth. He must make a pleasant home and surround himself with intelligent companions. His ambitions must not be as the witty and eloquent Ingersoll said, "to raise more corn to feed more hogs, to get more money, to buy more land to raise more corn to feed more hogs," and so on adinfinitum. Instead, he should conduct his affairs of life and business so that when his days of activity are over he could look back over a life of usefulness with the satisfaction not of owning broad acres of land and possessing great riches, but with that serene satisfaction that comes of a knowledge of having spent an honest useful life, conscious of leaving the world better than he found it. Such a man, when summoned by death, can, as the poet says,

"Wrap the draperies of his couch about him,
And lie down to pleasant dreams."

Such we hope will be the farmer of the future."

VALUE OF EDUCATION TO THE FARMER.

E. J. McQuiston, Before the Worth County Farmers' Institute.

All civilized men have more or less appreciation of education and are in some degree educated, as the term is understood. The more a man knows the more he wants to know, and the more he wants his children to know. There seems to be hardly a possibility of a doubt of the value of education to any class of people.

Observation of the relative condition of races, nations and communities that have long enjoyed educational advantages, as compared with communities and people not so favored, abundantly attest the value of education the very first work of the American pioneer farmer, after providing shelter and sustenance for his family, has been to establish common schools, and even higher institutions of learning, and every year he voluntarily taxes himself to support them. Hence I say that men instinctively believe in the value of education, and I do not enter into a discussion of the subject to establish the fact of its value. That is admitted. But we may be and are led to value anything more that is of real value by thinking about it, and we may derive some benefit by considering this subject in a meeting where farmers convene to discuss matters of mutual interest. Education may be considered, primarily, as the growth or develcpment of the inherent germs of physical, intellectual, moral and spiritual powers of the individual, and secondly, as a special training in certain lines, as a preparation for some occupation or profession.

Education, primarily, I have said, is simply a growing of the individual in all his faculties. It proceeds from within, not from without. It is not an external something that can be added to the person or persons like a coat, or poured in like water into a jug, or laid on in successive courses, as a mason places the brick upon a wall. Education is the result of self-exertion in living bodies or mind. The tree, indeed, grows by successive rings of wood, formed yearly, each upon the surface of the preceding, but the particles of substance out of which these rings are formed have been drawn from soil and air by its own mysterious, invisible life principles, and transformed into wood, and that, too, of its own peculiar kind. Why does the oak, the pine and the maple that perchance stand side by side, grow wood of such distinct peculiarities and products, all from the same elements of earth and air—the oak with its tannin, the pine with its pitch, and the maple its sugar?

Why does the corn, wheat and the barley, growing out of the same kind of soil, beneath the same sunshine and watered by the same genial showers, produce from these similar sources of supply such distinct and characteristic results? Surely the life principle within each moulds the same elements into new forms different from each other and different from the elements out of which they are made. Here is a mysterious power in plant life which we can see only by its results. Man is a complete being. He possesses a physical nature that is as truly of earth and air as that of any of the lower order of beings, and it grows in the same way by assimilating the elements that surround him. He inhales the air, even though it be at zero temperature, and by it his blood is purified and sent coursing through his body, laden with new cells of living substance to replace everywhere the cells that have served their purpose and parted with life. But man is more than a body. He is, indeed, an animal, but he is more than an animal. He has an intellect, by the exercise of which he has the power to apprehend or receive a knowledge of external facts through the senses. He has a consciousness of good and evil, and is, therefore, a being endowed with moral faculties. He has an intuitive perception of the spiritual and apprehends something of the first great cause of all things, which calls forth his veneration, and he worships, hence he is a religious being.

Education has to do with the harmonious development of all the powers of this wonderful complexity. The body grows strong from nourishment and proper exercise, and in the manner of growth of the mental powers there is a very marked similarity to that of the body. That is, by self action and assimilation, by grasping and using the means necessary to intellectual, moral and spiritual growth. The whole subject may be comprehended in a single sentence, viz: Man is educated, or rather educates or grows to a full measure of his powers by a proper voluntary exercise of all his faculties.

I want to say to any and every young person, if you are to be educated, you must do the work yourself. Some other person might eat your dinner, but you would go hungry. If some other person does your thinking, you will remain weak in mind and ignorant. No one can give you an education. You must reach forth with all the powers you possess, even though that be as the putting forth of the feeblest tendrils of the vine, grasping something to raise it nearer to the sweet light upon which it feeds. And I want to say to those who have sons, daughters or pupils to educate, if you would succeed with them you must inspire them with the idea of self-effort. There are too many young people who are dawdling along through their school days, depending upon teacher or others to drive, drag or carry them through a course of study, expecting to come out at last with all the knowledge and accomplishments necessary in life's struggle, who are doomed to bitter disappointment. They will find themselves but weaklings, overgrown infants, fit only to be jostled aside by those who have grown strong through self-exertion..

Now, while it is true that the education of any person must depend, first, upon his own exertion, it is also true that the conditions which surround him have a very great influence in aiding or hindering his progress, and it is within the range of human power to make or improve some of these conditions and to furnish many needed helps. In this possibility to furnish helps lies the field of our labor in providing schools and furnishing them with the best educational appliances, the first factor of which is a good and competent teacher, and the second a neat and comfortable room with cheerful surroundings.

The farmers of this county have proven their faith in the value of education to themselves and their children by supporting and having in operation nearly one hundred rural schools, besides contributing more or less to the support of the town schools.

We believe the home, the common school, the church and the college are the soul gardens in which are grown immortal beings. They are the chief educational forces. But the farm is pre-eminetly a home, and the home is at the head of the educational institutions. The farmer is a home builder, an educator. He is the producer of food and material for clothing for the millions on earth.

Surely education is not more necessary to any class of earth's toilers than to the farmer. He has moral responsibilities equal to those of any other class of men. When the moral standing of the rural population of a nation is corrupt that nation's doom is near at hand; hence, as a citizen and a patriot, he needs the intellectual and moral power that comes through proper education. The farmer as a citizen is at present the conservator of the nation's stability, and upon his action largely depends the perpetuity of our free institutions. It is the tendency of the worst element of society to congregate in the large cities, so much so that they outvote the better elements and thus control the political action of these large communities, the power of which drifts into hands of men who, having received it at the hands of the enemies of good society, are not overzealous in using it for the suppression of evil and the protection and support of the right.

There is a floating class in the large cities that have but little permanent interest, and yet they handle the ballot like a two-edged sword, and that, too, under the influence of prejudice, passion and ignorance.

The farmer is permanent. He votes for his home, and when war wages its wide desolation he fights for his home. How necessary that he should have that breadth of culture and intelligence that he can clearly understand the great questions of national importance and cast his ballot knowing the trend it will give to the nation's destiny.

Education is not only valuable to the farmer in every line of effort, but the farm itself is a great educator. The farm is the best manual training school in the world if the training is wisely conducted. From the very nature of things each member of the family has something to do. The children delight to do little errands and will take many a step to relieve tired father or mother, if he is made to feel that he is helping. The chief good in their doing is the training it gives. "He learns to do by doing." He learns to observe, to see and to hear with a purpose, and this is the beginning of all learning. This doing and increasing ability to do, can be carried on through all the stages of the child's growth, until a character for industry, stability and acuteness in correct and practical thinking is established.

The grandest and most valuable products of our farms should be, and must be, *now* and in the years to come, the best type of manhood and womanhood. Then we shall know that education is valuable to the farmer, and that the farm has been one of his most valuable educators.

Then, brother farmers, let us in all our toiling and getting, get for ourselves, and help our children to get, training and knowledge, whereby comes wisdom and understanding and virtue, for these are the principal things, and these alone make even immortality worth possessing.

WHAT CONSTITUTES SUCCESS IN FARMING.

J. H. Sherman, before Sioux County Farmers' Institute.

It has been said that "nothing succeeds like success."

To discuss a question is to admit there is a negative to that question. Perhaps no two persons present at this meeting would entirely agree as to what constitutes success in farming.

To many people, the successful farmer is the one who accumulates the most wealth. While the acquiring of property is one of the essentials of the successful farmer, it is by no means the only one. There are other attributes to success fully as necessary. Integrity of character is of more importance than a bank account. One farmer may be gathering dollars, while his neighbor is accumulating honor, truth, wisdom and righteousness. "Goodness of heart is better than fine raiment."

The successful farmer breeds and keeps good horses, cattle, hogs, sheep and poultry, but while doing this he does not forget that he is a citizen, that he has religious, social and political duties which he can not neglect and be considered successful in the community in which he resides.

By keeping good stock we do not mean that he should buy fancy-bred animals at enormous prices out of all proportion to their value, nor should he be a crank on religious subjects, or a dude in society. Neither should he think that the pinnacle of success can only be reached by devoting the greater part of his time to politics and being elected to some petty office and having the word "honorable" written before his name. He should be moderate in all things.

To be successful the farmer must know how to grow good crops, and at the same time retain the fertility of the soil. He must know when to plant the seed and when to harvest the crop. He should make his home as pleasant and beautiful as his means will permit.

We believe that a man's surroundings has much to do with the formation of his character and the character of his children, therefore, he should strive to keep his farm, his buildings and his fences in a neat and tidy condition. Nothing contributes more to the neat appearance of farm buildings than paint judiciously applied.

The successful farmer should live a just and upright life, honoring God and keeping his commandments. He should teach his children to become good and upright citizens. To do these things successfully he must be a thinker. He should have what all must have who would succeed in any business undertaking, and that is comprehension.

What is comprehension? It is the ability to see, to know, to understand, to comprehend. What makes the difference between the man at the head of large affairs and the day laborer? It is comprehension. Let me say to the young man who is about to engage in the business of farming that if he would be successful in his calling he must have comprehension. He must learn to reason and think for himself, and use his head as well as his hands.

Farming is now an occupation worthy of the best thought of the greatest minds. There is a vast field now open for the scientists in this direction. The word farmer now no longer suggests the uncouth, ill-dressed figure depicted by the comic papers. He is today the most vital force of this great Nation. Much is expected of him, and he is proving himself capable of the demands made upon him. The successful farmer is today laying the foundation of the future greatness of generations yet unborn.

We have outlined some of the essentials of the successful farmer of the present day. We have also endeavored to point out some of the things he should avoid. To sum up the requirements of the successful farmer, he should have first of all "comprehension;" that is, the ability to see and understand what is necessary to secure the desired end. Next he should have the energy and ambition to apply this knowledge and understand it.

To be a successful farmer in the broadest sense of the word not only means a farm well tilled, but a farm well filled.

FARM BUILDINGS.

A. T. Zimmerman, before the Cherokee County Farmers' Institute.

Since the condition of this country is so rapidly changing from that of a largely grain producing to a very mixed grain and stock producing country, and also the stock being partly for meat production and partly for dairy products, and the sheep industry beginning to make its appearance, all requiring some difference in construction and interior arrangement of buildings for their protection, we shall not confine our thoughts to a particular set of buildings, but endeavor to mention some things in regard to farm buildings of a general character.

Our domestic animals are so far removed from their primitive condition that they may almost be said to be artificial in their development, and nature has made no provision to adapt herself to these conditions without the help of man. No more than mankind can these animals withstand natural surroundings without protection, by the use of some of nature's products.

Since man is possessed of a being and powers beyond that of mere animal creation, it would entitle him to the first place in the use of these productions. It is for this reason that we give the family dwelling the first place in the matter of importance of farm buildings. It is the home, the house and its occupants, which come up first before the mind when "home" is mentioned.

We can hardly go into detail of arrangement of the house, for what would be very satisfactory to one person might be very unsatisfactory to another, owing to difference in taste and opinion.

Plan the location and arrangement of the house for the satisfaction and pleasure of those who are to occupy it. Consider the comfort of both the men and women of the household. While the men may not spend much time in the house, but to eat and sleep, it is well to give some thought to pleasure and comfort in these things, for sitting down to your meals in harvest time with your back close to a hot stove, and then go to bed close up under the roof of the house with poor ventilation, does not fit one for the best use of his physical strength, or his best mental effort in planning the management of the farm operations, nor does it aid in anywise to the development of his highest ideals of moral character. If so little comfort can be taken while supplying the physical requirement, what will be the condition of the mother and smaller children who must spend a greater part of their time within the house? Surely, it will not aid the mother and daughter in the development of that cheerful, sunny disposition and affectionate character which goes far to make the home the best place on earth; where the father loves to remain, and to which the children, after becoming separated by taking up life's work, often return with greatest of joy and satisfaction, and where their affection for all that is good and true is strengthened.

Locate the house near the well, unless for some reason it may be impracticable, and in that case plan to use some mechanical means to put the water in or near the house. It will be very convenient in case of fire, as well as a great relief to the weary bones and aching muscles.

Let the rooms be ample, with an abundance of light, with an arrangement that will be convenient and comfortable. A good cellar under the house is convenient in bad weather. Many object to the cellar because of its unhealthfulness, but with proper management it need not be open to such criticism if it has proper ventilation. If possible, plan an arrangement that will afford a cool retreat from the heat of mid-summer and a snug defense against the frigid blasts of winter.

There does not seem to be any necessity at present to plan anything about the farm to induce the family, or any member of the family, to get away from the farm to find employment or pleasure, but rather, if possible, plan means whereby some pleasure may be gotten out of farm life that will appeal to the people in their rush for excitement and entertainment.

Plan the location of barns and lots so that the slope or natural drainage will be away from the house, and a much shorter distance will be necessary, which will be a conisderable advantage in choring, and especially in caring for young stock in rough weather.

If all barns and buildings for the protection of animals are built with ample room for the number of animals to be accommodated, it will obviate the loss which sometimes results from overcrowding in severe weather by trampling or smothering the weaker animals.

In calculating room for horses, allow a stall nine by fourteen feet for each team and one or more extra stalls that can easily be turned into box stalls for the accommodation of young colts and sick animals; or it would be better if large roomy box stalls could be provided for this purpose. Let tne apartments for hay and grain be planned on a generous scale, so that an abundant supply of feed may always be kept near at hand. It will aid in giving the animals that beautiful color (fat) that has so much influence in making a sale.

For beef cattle, not much room per animal will be necessary. Floor space of about thirty square feet for each animal will generally be found satisfactory.

Dairy cattle, to make the best returns for the amount of feed consumed and labor bestowed upon them, seem to require warmer quarters than beef animals, for the food consumed goes largely into the production of milk and butter, while the beef animal makes himself comfortable with a thick coat of fat. Also, comparatively more floor space will be required for the milking herd, so as to accommodate the milkers.

It would seem from the appearance of many barns that more attention is given to summer ventilation than to winter comfort, the construction being such as to permit wind and snow entering in abundance. Ventilation is a good thing, but should be by some controllable method. The buildings should be light, dry and comfortable, especially where young animals are to be cared for in the cold and damp weather of winter and spring. Many young animals suffer irreparable damage by reason of cold, damp, dark quarters. This applies with special significance to young pigs. The hog house many times does not receive the attention which conditions would warrant.

The hog being liable to so many diseases and ailments, and yet withal is an economic source of revenue when he can be induced to live until he fulfills his mission on the market, it behooves the farmer to use his best effort in providing a place as comfortable and healthful as possible. The main feature of the hog house should be good ventilation and dry, with plenty of light and warmth, especially if young pigs are to be cared for in winter or early spring. An interior arrangement that will admit of frequent changing of bedding in the easiest manner and shortest time will possibly be of greater advantage in performing a disagreeable job.

A cement floor would have the advantage of being smooth, and if properly built, practically indestructible. We have had more experience with cement floors and would be glad if that feature might be taken up in discussion and applied to all farm buildings.

The most essential feature of cribs and granaries is that they keep the grain dry and in good condition for feed or market. Be sure the buildings are strong enough, so there will be no sagging or bulging that will permit leaking of grain or allow rain or snow to enter.

The location of cribs or granaries for grain that is to be fed out on the farm should be selected with an eye to convenience in placing the feed before the animals.

The necessary capacity of these buildings will depend upon the general mangement and arrangement of the farm, as to quantity of grain produced and number of animals to be fed.

The women folks of the farm are as proud of successful achievement in their undertakings as the men, so give them a chance with poultry by providing substantial and adequate poultry house in keeping with the oft-repeated suggestions in the contributions to the farm and poultry journals.

Fences may be taken into consideration with farm buildings. We would say, build as few fences as the best use of the land and the proper caring for stock will permit. Fences that are effective and substantial are expensive, and if weak and ineffective, may be even more expensive. in allowing the trespassing of stock. No fence adds anything to the beauty of a landscape, field or lawn, and neither do they aid in the cultivation of a field, but there is generally a poorly cultivated strip of land along the fence. There is probably no one to whom the task of cleaning out the weeds from a line of fence has fallen but who has wished the fence was not necessary. However, fences we must have, and the posts are the backbone of them all. No complaint was ever heard from anyone having set the posts too close together, too solidly, or of their being too strong or lasting too long. Owing to the extremely high price of lumber, board fences can hardly enter into consideration for the average farm. except in limited quantities for some special purpose. Barbed wire will continue to hold its place on most farms for a considerable time to come on account of cheapness and effectiveness in controlling cattle, although it destroys the value of many excellent horses.

Woven wire fences seem to be rapidly winning their way into favor and the manufacturers of the many different kinds of patent fences are vying with each other for superiority of their product in point of economy, strength and durability. The woven wire has the advantage over other fences in point of strength if protected at some points by barbed wire or other method if possible. By this we mean at top and bottom. If stock are allowed to get their heads over the woven wire and bear down, as cattle and horses will do in reaching for feed on the other side, the fence will soon loosen, and drawing through the staples and bending back and forth, will soon cause it to give way and break some strands, and we anticipate no merry time in mending or repairing a woven wire fence. Where the fence is used to confine cattle in small yards it also needs some protection to prevent them from rubbing against it, as the weight of the cattle thrown against the fence will soon stretch the wires and loosen the posts so the fence soon begins to get rickety. Protection may be provided for this by stretching barbed wire at the right height to catch the weight of the animals, and it will cause them to hunt another place to scratch. It would seem that a combination of barbed and smooth wire in the construction of woven wire fences, by plac-

Students at work in machine operating room, setting up binders and mowers down stairs and cultivating corn planters up stairs.

I. S. C.

Farm Mechanics Students in machine operating room.

I. S. C.

ing barbed wire at suitable points, would make the most satisfactory fence for general use. It would effectually turn all kinds of stock, and as horses nearly always injure themselves by striking or kicking over the lower wires, danger of injury in this manner would be obviated, as they could not easily get their feet through a well made woven wire fence.

In the erection of a woven wire fence do not be satisfied with anything less than a seven-inch post (top measurement), and eight feet long for corner and end posts, which should be thoroughly braced and anchored. A smaller post, though of sufficient length, will soon loosen by the weight of animals rubbing, swinging of gates, etc.

If a lawn fence is required, it will not doubt be the most expensive fence on the farm, for the farm lawn requires protection from the stock, and it will necessitate the strength of the field or stockyard fence, and will lay some claim to ornamentation to the extent one cares to go in beautifying the home surroundings.

OATS AND CLOVER.

Geo. C. White, before the Story County Farmers' Institute.

A large per cent of the farmers in this section are doubtful as to whether the average oat crop is a profitable one.

After corn and hay, oats is the next largest crop grown in Iowa.

To get close to the facts and find if possible whether the oat crop is profitable, and how it may be made more profitable, is the purpose of this paper and the discussion to follow.

The average selling value of the corn crop on the farms of Iowa December 1st of each year, has been for the past thirteen years nearly seventy million of dollars. The average yield per acre or corn during that time has been thirty-two and one half bushels per acre, and the average price twenty-eight cents per bushels. From this you will find the average crop has been worth nine dollars and ten cents per acre on the farm the first day of December.

The hay crop is second in importance, with an average value of over thirty million dollars. An average yield of one and one half tons per acred, valued at five dollars and fifty-five cents per ton, gives an average value of eight dollars and thirty-two cents per acre.

The oat crop is third, with an average value of twenty-five million dollars. An average yield of thirty-one and one half bushels per acre, valued at twenty-three cents per bushel, gives an average value per acre on the farm of seven dollars and twenty-five cents. While these figures show that the oat crop is not so valuable as that of corn or hay, not taking into consideration the value of its straw, oats furnish a feed for horses and young stock that we can not well do without, and it is about the only small grain crop that can be profitably grown in the central part of Iowa. From statistics gathered, it would appear that the average value of oat straw on the farm is nearly one dollar per acre. Adding this to the grain value, would bring it in close competition with hay as the second most valuable crop in the State.

We must have some crop with which to seed our timothy and clover and to form a proper rotation of crops, and it is very doubtful if any will serve the purpose better than oats.

Our success in growing oats, like corn, depends largely upon the variety and quality of the seed sown. The early varieties usually give larger yields and grain of better quality than the late varieties, besides, one is sure of getting them cut and shocked before the July storms have twisted and blown them to the ground.

The variety known as "Early Champion" has been grown in this county (Story) for about ten years, and is being grown in many neighborhoods to the exclusion of almost every other variety.

All seed oats should be run through a good fanning mill to remove mustard, weed seed, sticks, straw and light oats, so that the seeder may do perfect work. About three bushels per acre should be sown, but in seeding clover with oats, and I believe every farmer ought to sow clover with one half or more of his oat crop, then two and one half bushels of seed per acre is enough. We get a few less bushels of oats per acre, but the clover will be enough better to more than make up the loss.

Professor Holden has told us that the Formalin treatment to rid seed oats of smut will increase the crop from five to fifteen per cent. We should get acquainted with this treatment and all use it.

Don't sow oats that have been hot in the stack or bin, as there is too much danger of getting a thin stand and poor crop.

The best oats are grown on land that is moderately strong, and that has grown a crop of corn the previous year. It seldom pays to sow oats on a field that has grown oats or other small grain the previous year.

Oats should have a fine, mellow seed bed, so as to get the seed well covered, but the seed bed should not be too deep. If the field is rigid from plowing the corn the previous year, it should be worked over with the disk or spader before the seed is sown. Unless you do this two thirds of the seed will be in the low part between rows, and the stand of oats on the ridges very thin.

After seeding disk the field again and harrow until the seed is well covered, the field level and the cornstalks well torn to pieces and scattered.

Oats should be cut before they are quite ripe. If a little green there will be slight waste from shattering, the straw will be better and they can be shocked much easier and better.

Eight to ten bundles is enough to stand up for a shock. Make your shocks straight, round and compact. Sit each bundle down solid. Draw the top of the bundles together when the shock is finished, then break one bundle and lay it on the shock solidly and carefully so the top is well covered, with the head of the cap sheaf to the west. Place but one cap sheaf on the shock, and by putting the head to the west but few caps will be blown off.

Be careful to get your oats well shocked, for about one year in every five oats are badly damaged by rains while in the shock.

About twenty-five years ago my father decided I was big enough to help sow grass seed, and as there were few seeders at that time, the labor of seeding was considerable, and it was often necessary that two or three work at seeding a field. From that time to this I have had a part to take in seeding almost every spring. At that time the grass was usually sown as the frost went out, while the ground was very soft, and sown on winter wheat and rye. These crops are very good to seed with, but as neither one is considered a profitable one in this part of Iowa, I have sown my clover and timothy with oats for several years, and believe the early oats fully as good a crop to seed grass with as any I have tried. I have also tried sowing oats with Manshury barley.

I usually sow the clover seed after the disking is done, and cover with the harrow. I think six pounds of clover and five pounds of timothy seed to be about the right quantity to sow on an acre, or in other words, a bushel of each to ten acres. While we might sometimes sow three bushels of oats per acre and yet get a stand of grass, the grass would have a much better chance if the oats were much thinner.

The conditions favorable for clover to grow are, first, a good seed bed, so that you can get the seed covered in moist earth but not too deep; then a nurse crop to keep down the weeds, but not so heavy and dense as to smother the clover. If it is not too dry and too hot at the time the oats are cut, the clover will be all right. If clover, up to cutting, has been shaded where the oats are very thick, it is spindling, and in its most critical stage, so that by having the oats thinner the clover plants will be strong and more vigorous and better able to stand the hot July sun.

CONSTRUCTION AND LOCATION OF FARM BUILDINGS.

Chas. Lou, before the Scott County Farmers' Institute.

The proper grouping of buildings, with a view of meeting the requirements for horses, young cattle, milch cows, steers, hogs, sheep and poultry, without interfering one with the other working without hitch like a harmonious whole, with the least expenditure of time and labor to a farmer, is a serious problem in these times of high-priced land and labor, before which most farmers stagger.

Owing to the difficult of properly locating farm buildings and yards for permanent and suitable use, we find as a consequence that there is continual shifting and changing, an annual rearrangement to suit the new demands. It is never just right. "We must fix this or that difficulty next year," and so the work of change and reconstruction goes on from year to year.

We never fully realize that ideal condition of farm arrangement which represents the largest amount of work done in the least time and in the most agreeable way.

We find the corn crib at a distance from the hog platform or feed yards, requiring the carrying of thousands of bushels of corn through deep snow and mud, when it might have been shoveled. We find that slops and water are carried in buckets to troughs through barbed wire fences, where, with proper piping it might be made to go by its own pressure. With up-to-date machinery and practical arrangement of buildings and yards, there ought not to be any water pumped by hand, grain bundles, hay or straw pitched, slops carried in buckets or corn in baskets, or manure spread by hand.

To further reduce expenses on a hundred and sixty acre farm and where six horses are kept, is to work one set of four-horse machinery. It is cheaper and less annoying, or in other words, more profitable to keep a team than a man.

With hornless cattle, which can be handled like sheep or hogs, we are today enabled to greatly economize in space of yards, troughs and sheds, in their care and shelter. With this advantage, the buildings can be grouped more closely, space and distance reduced, which implies a corresponding reduction of time and labor.

With a capacity for a large surplus of feed, the farmer who, under ordinary circumstances, is forced to buy in times of shortage and high prices, will now be changed into a seller, always selling in times of scarcity and high prices, and storing in years of plenty. There will be no need of making hay stacks and incurring waste during a heavy hay crop like the last two summers. The great waste to hay in stacks would more than have paid for building barns and sheds higher. The hay stack should soon be a thing of the past.

We have also reached the period of economic agriculture where we can not afford to waste our straw.

Buildings should be grouped to give the cattle yard protection, viz: breaking the north and west winds completely, with no gaps for puffs or eddies. Many of our barley sheds that might have been made to give a sunny protection to cattle in winter, stand alone, a cold and gloomy barrack, giving no return for the investment other than to hold barley one month in the year. With no other use than this they become a poor investment, and cattle prefer the south side of a straw stack to a chilly building of this kind. They can be built to admit the sun on the south side, with feed and litter above, and make an ideal winter resort for all kinds of live stock. In case of such a building, large doors for the entrance of the manure wagon should be made on the opposite side of the cattle entrance, to avoid the muddy or rough frozen cattle yard. Furthermore, I would provide all feeding places for loose cattle with a self-supplying hay rack, which requires filling only once or twice a week and can be closed during mid-day, or when not needed, by hanging doors.

For large and wide hay-mows, I would recommend hay chutes, four by four feet, directly under the hay carrier track and mounted by a hay dump which can throw the hay at an angle into the adjoining partitions. This will be a labor-saving device, inasmuch as the spreading of long hay in a superheated haymow is another feature that is driving men and boys from the farm.

In a modern barn there should be placed a manure carrier to help the boy that cleans the cow stable. With ample track and switches it can alike be used for cow and horse stalls. All winter manure should be dumped in a frost-free place and hauled out in the winter when there has been no hatching or evaporation and when time and labor is more plentiful and roads and fields are hard. This is an important item to be reckoned with in putting up new buildings.

In case of large barns, which are usually empty of young cattle in the summer, one end should be provided with an adjustable floor to be raised for admitting grain in bundles from top to bottom, and to be lowered again after threshing and filled again above with either straw or bedding, or aftermath for young cattle.

Every building should be constructed to answer as many purposes as possible and to stand empty least of the time. Grain under cover is better than grain in stack, as we all have learned to our great sorrow in the last two wet seasons.

We are living today in the transitory stage from lumber to concrete. Lumber, high in price, poor in quality, short in lasting, should not be used where concrete or cement can be substituted. Lumber for feedways, troughs, floors and gutters, all close to the ground, is very unsatisfactory compared with concrete. It shrinks when dry, expands when cattle slobber, breaks, splits, wears and protects rats and mice. Concrete, though more expensive at the start, is far cheaper in the end. It is practically indestructible. It will be but a few years hence when we will be making fences with concrete fence posts, which never need resetting.

All large buildings should be provided with gutters that have a vertical drop on the south or east side, and water carried off either underground by sewer or by surface drainage, away from the cattle yard. A sheet of water dropping from the roof of a high building is a cause of much rot to sills and an endless source of annoyance. Water should by all means be made to avoid cattle yards, and buildings located accordingly.

These directions in the main, followed as far as practical, with good substantial fences added, a perfect arrangement will be approximated, if not entirely realized. However, every man must be the designer or architect of his own place, and in proportion as he surmounts the obstacles and triumphs over the many difficulties which present themselves, to that extent will he appreciate his success as a farmer and enjoy his calling.

THE FARMER'S ORCHARD AND FRUIT GARDEN.

Wesley Greene, before the Madison County Farmers' Institute.

I believe you will concede without argument that every farmer should have an orchard and fruit garden wherein he could raise all the fruit needed by his family. To talk of fruit growing as a business or commercial enterprise is an entirely different proposition. Yet, if we should look at it from that viewpoint the orchard offers greater inducements than the fields of waving grain or golden corn. The average farmer is satisfied when he realizes twenty-five dollars an acre as gross receipts for a crop of corn, and when he raises one hundred bushels an acre and receives fifty cents a bushel for it, he thinks he is on the road to fortune. Yet three thousand quarts of strawberries, at ten cents a quart, are as easily obtained as the one hundred bushels of corn at fifty cents a bushel. While this statement may be verified, you and I know that fortunes are not figured out on paper or picked off bushes, but are only made through years of toil and frugality.

Having followed the plow for nearly fifty years. I am somewhat familiar with the conditions which surround farm life and with some of the difficulties with which one must contend in that vocation. I know how pressing are the demands of field work and one's time at certain seasons, and how the orchard and garden may be forgotten, or only receive attention semi-occasionally, on rainy days, when it is too wet for other work. Unfortunately, however, this is a time when it is unsuitable for garden work.

When properly attended to, the orchard and garden pays a larger dividend than any other acre on the farm. Fruit growing, like stock farming, is a business of itself, and requires thought and experience to make a success of it.

How to succeed best is the question at issue this afternoon. We can only hope to give you a general outline of the work and then leave it with you to apply to your local conditions. What I have to say will apply to the home orchard. No one should venture into commercial fruit growing until he knows what he can do. That also applies to any other business or calling in life. Let your liking for the business determine the extent to which you will engage in it, for that will in a great measure determine your success.

A high elevation, with dry soil, is the best location for an orchard. It need not be the highest land, but should be higher than the adjoining land, so as to afford good air drainage to protect the blooming plants from late frosts. A northeast or north slope is preferred in selecting a site for an apple orchard, but as these conditions can not always be had on the farm, you must select a place frequently that is not so well adapted to the varities you wish to raise. We would prefer to have the orchard and garden near the house so that the fruit could be gathered every day while in season, without going a great distance. The good housewife will make daily excursions to the fruit garden to see what it contains that will be appetizing to the household.

After having selected the location, prepare the soil as thoroughly as you would for a crop of corn. When the soil is a stiff clay I would use a subsoil plow. Plant as early in the spring as the soil is fit to work. If the trees have been recently dug from the nursery, cut off the end of the roots with a sharp knife; they will callus more quickly and roots start to grow from them. When trees are stored in cellars over winter, the roots will not need trimming, as they usually callus in the storage cellar when properly attended to. The trees should be planted about twenty-four feet apart in the row north and south, and the rows thirty-two feet asunder east and west. Twenty-five apple trees, ten years old, when properly cared for, will bear several hundred bushels of apples. That would be more than an ordinary family would use, so one does not need a great number of trees.

"What varieties shall I plant?" is a question often asked, though not easily answered, except in a general way. People differ widely in their likes and dislikes of flavor in fruits, so the selection must be largely a personal matter for each planter to determine for himself. However, I will name those which usually do the best in this State, and for that reason are regarded as standard sorts, and will generally prove to be the most satisfactory.

The list I would recommend is as follows: Yellow Transparent, Duchess of Oldenburg, Benoni, Wealthy, Fameuse, Grimes Golden, Jonathan. Genet, Roman Stem and Ben Davis. Probably you would not care for all these varieties, but they are all good standard sorts, though there are other varieties you may prefer and that will thrive and do well in this country.

Buy two or three year old trees from a reliable nurseryman, and the nearer your home the better, for he will probably have the varieties best suited to your locality.

The depth to plant will depend somewhat on the nature of the soil, the more looser the soil the deeper you can set the trees. usually three to six inches deeper than they stood in the nursery will be deep enough Set the tree as firmly as you would a fence post and you will not have occasion to complain of dead trees, if you give them proper care afterwards. Cultivate the ground as well as you would for a crop of corn until the trees come into bearing, and I prefer to do so even when in bearing. However, if the orchard is on a steep hillside, so that the soil would wash, then sow to clover and cut the first crop every season and remove it and allow the second one to remain for a mulch and to reseed the ground.

By cultivating the orchard you stimulate growth in the trees. You can raise an early crop of corn or potatoes that will pay you for the cultivation and not rob the trees if you understand farming, and I take it for granted that you do. After the early crop is removed you can sow buckwheat, oats or barley in midsummer for a cover crop to protect the roots from freezing and thawing in winter, or if you do not sow a cover crop, spread manure over the ground about the trees and it will serve the same purpose. It is well the first few years to give some protection to the trees against mice and rabbits and to keep a watch that borers do not get into the trees. Head the trees thirty to thirty-six inches from the ground and give such pruning as will keep them in proper shape.

No well regulated fruit plantation is considered complete without a spraying outfit. The home orchard will only require a small, inexpensive apparatus. Spraying to be effective, must be done intelligently; haphazard work is of little value, if it does not do more injury than good. Spraying is a preventive measure rather than a curative one.

For the plum orchard the native sorts are the best. Plant Wild Goose and Forest Garden for early, De Soto and Wyant for midsummer, and Miner for late. There are other sorts which do well, but these are popular varieties. The Lombard and Blue Damson are European plums, which do fairly well here, and Burbank and Abundance are the best of the Japanese sorts for this locality.

Pears are rather uncertain unless you have clay soil. They usually die from blight on the dark prairie loam before fruiting. Kieffer is the most reliable sort, though not of the highest quality.

Among the cherries, Early Richmond and Montmorency are the best. English Morello or Wraggs are late sorts.

The Bailey and Mitchell peaches seem to be the hardiest strain of seedling peach trees; while the fruit is small, it is good in quality. The budded varieties are larger in fruit, though not quite so hardy. Alexander, Crosby, Crawford, Champion and Triumph are among those usually recommended for the southern half of the State.

Gooseberries are easily raised; give them rich ground and a cool place. Houghton and Downing are the best varieties for general planting. Pearl is also a good sort.

Currants need a location similar to that for gooseberries. Cultivate them well or mulch heavily in dry weather. The currant and gooseberry bear on wood two years old and over; cut out the old wood after it has borne several crops, so as to keep the bushes in a good healthy condition.

Raspberries should be planted two to three feet apart in the row, and the rows five to eight feet asunder. Give good cultivation, cut off the tops of the black varieties when two to three feet high, so they will send out branches to make them self-supporting, otherwise they will grow a long cane that will sprawl on the ground. The side branches are cut back to a foot or eighteen inches in the spring. The red varieties are not usually pinched back, though they may be treated the same way. They grow upright and it is not the usual practice to cut them back. The most popular red varieties are Loudon, Cuthbert and Turner. The black sorts are Palmer, Kansas, Older and Gregg. Shaffer and Columbia are purple sorts. The yellow raspberries are not much grown, though they add variety in color. Bebee's Golden and Golden Queen are the best of this class.

Grapes are so easily grown that there is no good excuse for not having an abundant supply of this luscious fruit during its season There are a number of varieties that will do well in this country. The most popular market varieties are Concord. Worden and Moore's Early, and are hardy enough to stand the winters without covering. Delaware. Brighton and Woodruff are good red sorts, but not so rugged in constitution as the black varieties. It is best to give these some protection in winter.

We now come to the last fruit we will mention, though it is the first in season, if not the most delicious in the whole list of fruits, the strawberry. For field culture plant the rows about four feet apart, setting the plants two feet apart in the row; cultivate through the growing season, cover with straw, leaves or corn stalks when the ground freezes to protect the plants from alternate freezing and thawing, and you can have all the strawberries you can eat for two or three weeks.

GOOD ROADS.

F. G. Hanks, President of Scott County Rural Mail Carriers' Association, before Scott County Farmers' Institute.

With the establishment of the rural telephone system and the rural free delivery mail service, the people living in the country, and especially those in the isolated districts, have been placed in daily communication with the outside world and in close touch with the nearby towns and constant intercourse with their neighbors, placing within their reach the means whereby they are, in some respects, in advance of those living in towns where there is no telephone and no free delivery service.

They are reaping the benefits of a progressive country, and its effects have given an impetus to the advancement and education of the younger class, in placing before them the best literature and the greatest inducements of securing better advancements and success in life by aiming for a higher sphere.

The farmer has become better educated in his work and better posted in the markets of the country, and even the world, and by gleaning an idea here and a suggestion there from some one that has had a chance to improve on a point he has virtually became an expert in his line.

Progression is a vital factor to success.

While other enterprises and projects of the country and departments of the government are making such strides towards the betterment of their condition, let us take a look at the backward tendency of the country along the line of public highway improvement.

With the exception of the bridges and some cutting and grading here and there, the average roadway has not been improved to any extent for years. The work that has been put on them with plow and scraper and road grader has had no effect or part towards making them any better. With the present system of farming, a large per cent of the farmer's hauling on the public roads is done during the winter months, and that, too, at a time when the roads are frozen and rough, or are more or less muddy, and that means "hub dup" in the spring.

Then, too, during the winter season there is more light traffic on the roads than in the summer.

The people have more time to travel and seek pastime and pleasure with neighbors and friends and visiting the cities.

Who feels the need of good roads more than the progressive farmer?

There have been many plans for good roads brought before the notice of the public, some good and some poor ones. From among them all let us consider one that seems to be the most practicable, and the one adapted in most parts of the country where good road improvements prevail.

SAMPLE ROADS.

Let us look for a moment at what may be considered a sample piece of road on a main thoroughfare where traffic is heavy.

But the plan followed here must be governed according to the lay of the country and modified by the amount of traffic over the road.

Start by grading to the center to the proper height according to the location and circumstances, and about eighteen feet in width on top, with an easy crown, but look carefully to the drainage facilities, cover the top of the grade with small or crushed stone, the depth to be governed according to the nature of the soil.

On top of the stone put a covering of coarse gravel to a depth of six or ten inches, according to the amount of stone to cover.

If gravel or stone either are not convenient, use more of the other, and for rough sections of the country more care must be exercised in the drainage facilities than in the level sections. We now have a first class road that will accommodate the traffic into the large towns and cities, and as proven by the tests of years will prove a permanent and lasting road.

But for the country districts a single track road will suffice for most all parts, and a track eight or nine feet in width would be all that is needed, and to build any wider would be a useless expense unless you make a double track.

Now the question of material comes to the front. As far as I have observed and been informed, stone can be obtained in a great many localities that is easy of access, and at no great distance from any part of the country. Gravel can also be obtained in great quantities in most all the townships. While our county possesses a stone crusher, a large amount of stone used would not need to be crushed.

Next comes the tax.

AS TO TAX.

Those living in the more isolated districts will say we do not need improved roads as bad as our neighbors do, and we do not want the expense. Let us consider that point one moment. They live farther away from the markets and have to travel out of their locality into their neighbors', thereby passing over their roads to get to market, many more times than their neighbors travel over their roads. Let there be a uniform tax for all townships in the county, and paid into a general fund, thereby giving each one an equal amount of work to be done each year and paid out of this fund, thereby giving each one an equal amount of work according to the tax paid. Let us estimate the time it would take to improve all the main roads. An average township, we will say, has sixty-five miles of road and thirty of these are the main traveled roads. Let each township build two miles of road each year, and in fifteen years all the main roads will be in a condition to last for years to come.

We have a piece of road a little way over the line in Clinton county, made on this plan, that has stood for almost thirty years, and is in good condition today and has had but little repairs.

Wisconsin has many such roads and they are satisfactory in every respect, and once we get such roads the expense of repairs will be but a trifle.

Touching again on rural delivery, our association has for its aim: Better men morally and intellectually, better system and facilities for the advancement of the service, enabling the carriers to give better results to their patrons. Better pay for the work done by the carriers, and last, but a very important aim, "We want better roads."

We, as an organization, stand ready and willing to assist in all ways possible to help improve the condition of the roads, and we beg of you to take this subject under consideration and do all in your power to put some plan into action.

Owing to the fact that I have been advised to condense my subject as much as possible, I have omitted several minor points, that otherwise I would have mentioned, and some of those I have mentioned I would have enlarged upon. But hoping that you will understand the aim and feelings of our association towards the good roads movement, I will leave the subject with you.

RAPE AS A FORAGE AND SOILING CROP.

H. B. Strever, before the Cherokee County Farmers' Institute.

Rape is a comparatively new plant in this country. It is fast growing in favor, however, and promises in time to become one of our most useful forage crops.

Rape belongs to the same variety of plants as the turnip, cabbage, kale, mustard, etc. There are several varieties of it, the Dwarf Essex being the only one recommended for this country. It is a biennial, using the first season for growth and the second for production of seed. No seed can be grown here, as the plant cannot live through our severe winters,

The rape plant grows to a height of from one and one half to three feet. In foliage it resembles the rutabaga or Swedish turnip, but unlike the latter has no bulb or turnip at base of stem.

It delights in a rich, moist soil, where it will produce an enormous amount of foliage. It does well on any prairie soil of ordinary fertility in seasons of average rainfall. It makes but little growth during the dry, hot weather of midsummer, but with the advent of cooler weather and rain it springs into luxuriant growth, which continues until late in the fall.

An average crop will yield from ten to twelve tons per acre. On rich soil and under favorable conditions fully twice that amount can be grown. Owing to its watery nature rape is used only as a forage or soiling crop, and as such is suitable for cattle, sheep and hogs.

My experiments with rape cover a period of five years only. In the spring of 1898 I sowed about an acre, using five pounds of seed. About half of it was cut in the fall during a period of scant pasturage, and fed to cattle and hogs. Both ate it with avidity and apparently did well on it. That remaining uncut was pastured off with cattle.

In 1899 I sowed three acres of rape for soiling purposes, sowing it June 16th and using five pounds of seed per acre. On the higher and drier portion of the field it made a growth of about eighteen or twenty inches, while on the low, moist ground it grew to a height of about three feet, and contained such a mass of foliage that it required a man of muscle to lay it in a swath with a scythe. This crop was all cut and fed to cattle and hogs during the fall when there was practically no feed in the pasture. It filled a gap that so often occurs on western farms between grass and stalk feed.

In 1900 I sowed ten acres of corn to rape, sowing it July 3d, just before last cultivating, using two and one half pounds of seed to the acre. Timely rains gave it a good start, but it made only a moderate growth during the heat of the summer, but later it grew vigorously. When husking time came the entire field contained a dense mass of green foliage from two to two and one half feet in height. Literally a sea of green surmounted by the dead corn. Scarcely a weed was to be seen, the rape having smothered nearly all. So thick was the rape that it was with some difficulty that one could wade through it to husk the corn. Before husking it seemed as if much of this mass of vegetation would have to be destroyed in gathering the corn, but there was so much of it that the damage was hardly noticeable when the husking was completed.

After the corn was out the cattle were turned into the field and enjoyed what few cattle have been able to get in a stalk field, i. e., a balanced ration. The freezing and thawing of late fall killed much of the rape before the stock could consume it.

In 1901 rape was sown in corn as before but did not germinate, owing to the drought of that year.

In 1902 I sowed rape, clover and timothy seed on three acres of old pasture, disking it in. Before I should have done so I turned cattle and hogs into the pasture. Both cattle and hogs seemed to prefer the rape to the timothy and clover and soon not a stem of rape could be found. I sowed rape also in twenty acres of corn on July 17th, using about forty pounds of seed. It came up well but the cold, wet weather seemed to retard its growth as much as it did the corn, and for weeks it was small, spindling and unpromising. It changed little until the September frosts cut the corn, after which it changed into a darker color and started into vigorous growth, which was not checked until about the 25th of November, when it stood from fifteen to thirty inches in height. Ten acres of the corn was cut with a corn binder without much damage to the rape. The field was cleared of corn and fodder on November 25th and cattle turned in. The heavy snow fall of December 2d covered up the rape entirely. During December cattle were yarded and fed. With the warm weather early in January the green rape began to appear above the melting snow. The cattle were again turned into the field and for about a month enjoyed the best winter forage I have ever been able to produce. On February 1st I found plants of rape in the field as green as they ever were. Do not think that rape can often be put in cold storage for midwinter use. It is only when an early snowfall covers it before seriously damaged by frosts that it can be thus preserved.

Rape is quite hardy and does not seem to be damaged much by ordinary frosts, but after the ground begins to freeze it is soon destroyed if not protected by snow.

I wish now to call your attention to some of the experiments that have been made to determine the value of rape to the stockgrower.

Rape for Cattle. I have no data of experiments made to determine the value of rape for cattle in comparison with other forage plants. Professor Henry in "Feeds and Feeding" says: "For cattle rape is highly prized by some feeders as furnishing a succulent feed during the fall months and preparing them for winter."

For Milk Cows. At the Ontario Agricultural College rape increased the yield of milk with no perceptible taint, although fed before and after milking. Dairy authorities agree, however, that it should be fed with extreme caution.

For Sheep. At the Ontario Agricultural College rape proved as good for lambs as rape and one half pound of oats daily, but not as good as rape and other pasture. At the Wisconsin station lambs gained fifty pounds more on rape than on bluegrass pasture, and made better gains later on grain.

Prof. Thomas Shaw, of the Minnesota Agricultural College, says: "An acre of rape should furnish forage for from ten to fifteen sheep for two months. At the end of that time the sheep should be fat enough for ordinary marketing." He further says of rape: "Its fattening properties are probably twice as good as clover."

Rape for Hogs. The Wisconsin Experiment Station has made many experiments to determine the value of rape as a food for growing pigs. Professor Carlyle, of that station, says: "Rape is better green feed for growing pigs than good clover pasture. Pigs are more thrifty, have a better appetite, and make correspondingly better gains when supplied with rape in connection with grain feed, than when fed with grain alone. Rape is the most satisfactory and cheapest green food for swine that we have fed."

In conclusion let me urge you to sow a few acres of rape. Sow it in a small field of corn before the last cultivation; husk the corn early and turn in the cattle, using the same precautions to prevent bloat that you would in pasturing clover. I believe it will partly, and perhaps wholly, eliminate cornstalk disease as a factor of loss in the West.

Sow a pound of seed per acre in small grain that you do not intend to seed to grass, and you will have excellent fall feed in stubble. I would not sow it with grain on very rich land where the grain is liable to lodge, as it may then cause trouble. On very rich land scatter seed on field after grain begins to come up.

If you need a hog pasture, sow rape either alone or with grain. Sow a little of it next spring, and later you will sow more. Like clover, it is strongly nitrogenous in its nature and is needed to balance up our carbonaceous feeds. For these reasons, and because it can be so easily and cheaply grown it should be found on all our farms.

To guard against disappointment I would advise sowing only English seed. as both German and French varieties are inferior as forage plants.

THE HOG AS A MORTGAGE LIFTER.

F. L. Cooper, Washta, Iowa.

The first question that comes to me in starting this subject is, why would select a hog to lift a mortgage?

To answer I would say: First. I must produce something that other people want and are willing to pay the cash for. The hog is always a ready sale when fit for market. Second. The income is usually available in from nine to eleven months. I believe no other farm animal can be turned in so short a time. Third. The proceeds from a crop of hogs is, or can be, a sum obtained at one time, and for that reason can be used to better advantage. Fourth. Because they will do well "any old way," but the better his treatment the greater the profit.

Now, what kind or breed will serve our purpose best? I would say, just the common hog. Let him be red, white or black. Some succeed best with a pure bred hog, while others do equally well with a cross bred. "Don't monkey with pedigrees." This part of the swine industry must be handled different, and I believe if the common hog is given the same care and attention, they are just as good for farm purposes as any registered herd in Iowa. A good swill barrel, if used liberally, will make a better hog than any recorded pedigree ever did. It may be I am courting trouble from the registered breeder, but it is my opinion that any one trying to lift the mortgage off his farm should not "monkey" with hogs on paper. The profits are more uncertain than with the hogs on the pasture.

Next, at what weight should the hog be marketed to secure the best results? Experience and observation has convinced me that from two hundred to two hundred and forty pounds is a good size to sell at, if fat and smooth. Circumstances sometimes alter cases; for instance, if my neighbor's herd have an attack of cholera it is a pretty good time to market mine, or as many as will go, after saving a few for seed.

Figuring on the certainty or uncertainty of the hog as compared with other farm animals I would say that we can count on about three crops marketed in four grown. Some lose more. In my experience I have lost two crops in twenty years. At the rate of one crop lost in four or five I believe the hog to be a good thing as a mortgage lifter.

There is one point I wish to bring out in connection with this subject. It may be a little on the side, but I consider it of vital importance as to the life or death of a mortgage. With reasonable care and diligence the hog will have done his part. Now, if the mortgagor fails it will be because he has used the proceeds of the hog for other purposes. We must hold these proceeds as a sort of reserve fund, using them only in such a way that there will be certainty of their being available at the time the mortgage shall become due. Strike with an avalanche of hogs and the mortgage will be buried deep, never to be resurrected.

In closing, I can only say I have tried to bring out a few points. Those who are to follow in this discussion are perhaps more able to handle the subject than I, therefore I will leave the matter in their hands.

WHAT IS THE MATTER WITH THE CORN CROP?

W. H. Lewis, before the Madison County Farmers' Institute.

This is an important question. We pride ourselves on our favorable location in the corn belt, and on our possession of a soil of inexhaustible fertility. We market vast numbers of hogs and cattle and train loads of corn, and seem to think we are doing the proper thing. The yield per acre is a variable quantity and we have been in the habit of accounting for all variations by a reference to the weather. A season with a proper amount of rainfall was represented by a large yield, and an unfavorable season by a light crop. Besides these variations there seems to be another variation that is constant, a diminution of the yield per acre. In the early part of the season, if conditions are favorable, the corn grows well, and the field seems to promise larger yields, but for some reason, on the farms that have been long in cultivation, the old time crops are no longer produced. We are told to rotate our crops, and that the clover crop in its proper course will restore the soil and the former yields will result. Now I am well aware that I am going in the face of the current theories of our day, but I do not think clover is the "cure-all."

Looking over our corn, there seems to be not enough ears, many stalks being barren, not carrying any ears, and the ears that are produced are too short; few, if any, are full to the tip, but on the contrary most of them have a point of naked cob, one, two or more inches long. the side of the stalk is less, and a ten hill shock is little if any more than half as large as in the good old days.

When our farms were new, they produced large crops of wheat of good quality. Repeated crops brought less, both in quantity and quality. After wheat failed to produce paying crops all planted corn, and it was for years almost the only grain produced. The wider range of the root system of the corn and its greater ability to reach and appropriate what is needed to maintain growth enabled it to make good crops for a time. After a few successive crops, the diminished yields, the shortened ears and the unfilled tips indicated a lack of some of the essential elements of fertility. Well, say our advisers, clover will remedy all of this. But does it? I say not. When corn follows clover it looks very promising.

it has good color, the stalks are strong, but the ears do not fulfill the promise of the early part of its history. The result seems to indicate that clover restores only a part of the material necessary to produce corn. What can we do now? How can we discover the source of our trouble?

Chemical analysis shows that corn is composed mostly of potash, phosphorous and nitrogen, hence it is a fair supposition that to produce corn the soil must contain these elements in sufficient quantity and in relative quantities or proportion. A crop of any grain to give best results needs a balanced ration just as much as a steer does to make a good growth and gain in weight. So we assume that we must have a sufficient amount in our soil of these necessary elements of fertility, viz, potash, phosphorous and nitrogen. Of these elements the ultimate source of supply of nitrogen is the air, it being in large part composed of nitrogen. The other elements, the potash and phosphorous, are of a mineral nature and exist only in the earth. Hence, if we use a crop of clover to restore fertility, the only possibility of making an increase of the quantity of the elements of fertility in the soil must lie in what it can derive from the air. If it has any other effect it can only be that of making more available what is already in the soil, unless it possesses creative power, which no one will assume.

The effect of clover on a corn crop seems to be a stronger growth, darker color, larger stalks, larger ears with unfilled tips, and later ripening, but not a return to the desired yield of grain. We can fairly and safely assert this change in the crop to be the result of an increased supply of nitrogen but it does not meet our wishes. We want more kernels.

We have now exhausted the possibilities as to a gain from the air, and it begins to look as if the deficient factor in the problem must be one of the mineral elements of fertility, and the thing to do seems to be to learn which one is needed if happily both are not in scant supply. If we turn our attention directly to our soil and interrogate it as to its wants, we shall find that an application of potash gives it but little help, so the answer from the soil would seem to be—I have enough of that. At this stage of the inquiry the conditions strongly suggest that the wanted factor in the problem is phosphorous. How shall we verify this hypothesis? What do we know about it? Not very much, I fear. So far as I know, no thorough and reliable analysis has ever been made of our prairie soil, and we do not know what elements it contains, or the relative quantity of either element. It must contain some of each element or it would not produce a crop, but the diminishing yields under cultivation indicate that some element is not present in sufficient quantity, and that the deficient element may be phosphorous. The only apparent source of information seems to lie in the geological history of this region. We are told that in the remote past a sheet of glacial drift covered all this part of Iowa. Later on another glacial deposit of great depth entirely covered the first one, and this last sheet makes our surface soil. Now if we can find where this later drift came from, or of what it was made, we can formulate a plausible conjecture of the composition of the deposit. If we could have been at the starting point of the glacier, and seen with what the great ice ship was being loaded before it began its voyage, we would know what would be the product of that cargo when ground to impalpable powder and deposited to form our soil. That not being possible, we try to follow its trail from here to its start. It seems to have come from the northwest, or from the Klondike region, but probably not so far. We can find some of what seems to be fragments and remnants of unmanufactured parts of the cargo that have been dropped along the way, and they seem to be mostly granite, some quartzite or similar material. The quartzite would yield sand and possibly some potash in combination with silex, but no other element of fertility. As the soil of this part of Iowa is all the product of this drift, it seems probable that potash would be an abundant element in the soil and that the other mineral element, phosphorous, is in very scant supply, and, if the hypothesis of formation is correct, it is difficult to account for the presence of any phosphorous. It is possible that some of the synthetic methods in Nature's laboratory may be such as to produce it by some process of combination or interchange, but in the present state of human knowledge it seems to be impossible. The conclusion seems to be forced upon us that our soil in its virgin condition was very deficient in the phosphoric element. The course of husbandry in the past has been such as to rapidly diminish the already small supply and exhaust the available portions of it. The countless trains of cars on every railroad were loaded down with the products of our farms, sold at such prices as to give away their fertility for the opportunity to get partly paid for the labor of taking it out of the soil and putting it aboard. The old story of the woman who killed her goose that laid the golden eggs has been considered an extreme exemplification of improvident greed, but it has remained for the western farmer on this fair prairie land to equal if not outdo her. Repeated cropping with no return of any of the elements of fertility is rapidly reducing our yield per acre. What shall be done? Growing clover seems to act as a stimulant, but it seems to me a fatal mistake to use stimulus unless it is accompanied by an addition of such other elements as are in scant supply. A whip may stimulate a strong but lazy horse, but it will not strengthen a weak beast or restore an exhausted one. The stimulating effect of clover will probably enable us to more rapidly and completely exhaust the store of fertility than we can without it, but is it desirable to do so? If the mineral elements are in sufficient supply, clover will probably give great help in making a large crop. but only in this case. Observation by others may disprove the fact of diminished yield, but I think it will confirm instead of disproving it. If it be true, the course of husbandry ought to be modified to suit the conditions, or means taken to modify the conditions. Some farmers may find the first the better course, for others the second may be best; it depends both upon the farm and the farmer. If you ask how this is to be done I can at present only reply, I do not know. Some of the most difficult questions start off with a how.

GROWING AND SELECTING SEED CORN.

Victor Felter, Washta, Iowa.

When we remember that three fourths of the value of Iowa's entire agricultural products is in her corn crop we readily see the importance of good seed corn. With the steadily increasing price of farm lands we must grow greater crops of better quality each year, that a reasonable rate of interest may be realized. Ten years ago an exclusive corn show was unheard of, while within the past year we have read of big corn exhibits in nearly every agricultural newspaper. The biggest corn show ever held in this State was the one lately held at the Iowa State College at Ames, where so large an exhibit of high quality corn was never seen under one roof. We all know that this magnificent exhibition followed the poorest corn year ever seen in Iowa. This, with several other great corn demonstrations within a few months, is only a criterion of what is to be accomplished within the next decade.

The actual cost of seed corn per acre is so slight that any farmer can well afford to plant only the very best seed obtainable. If practical each farmer should be his own seed producer, but if his neighbor or any one within reach has anything better, he can well afford, and is generally perfectly willing to pay a reasonable price for it. The time is coming and will soon be here, when every farmer can buy corn with a pedigree, the same as he does live stock.

Every farmer should plant a piece of corn, say five acres, along the side of his main field and take special care of it with the purpose of selecting his seed for the succeeding year. The best location would probably be on the south or west side of the field, on good rich soil; planting rather thin, so that a large per cent, of seed will be obtained. To procure the greatest yield, as large and late a variety as will mature with safety in this locality should be planted. Mixed varieties are to be discarded for various reasons, such as variety of color, irregularity of ripening and non-fertilization.

Where each farmer saves his own seed there is no better way of selecting it than to have a small box attached to the side of his wagon and as he finds suitable ears put them in this box. If the crop is thoroughly matured the corn is ready to be placed in the attic, or other convenient dry places where it will not have to endure any extremes in temperature. Unsound or immatured ears should be thoroughly dried out in some well ventilated place before being stored for the winter.

These are some of the practical methods of securing seed corn. Such methods have been practiced ever since the landing of Columbus. But with the ever-advancing civilization and steadily increasing values of Iowa farms we predict some wonderful advances during the next decade in corn culture and corn breeding. To yield a moderate income from one hundred dollar land it is very apparent that greater crops and higher quality are necessary.

The marked improvements in corn as in the past will in the future be acomplished by specialists. The average farmer is well able, and is far-sighted enough, to pay a good price for seed that will increase his yield even a bushel or two per acre.

The fundamental principles of animal husbandry are just as fixed and important in the corn breeding business. The old motto that "Like produces like" should govern all selections of breeding animals and farm grains.

Many farmers give the selection of corn too little attention, selecting their seed from some imaginable or fancied whim, not knowing whether their ideas are founded on correct principles or not. Some, for instance, want a smooth ear, because it is easy on the hands in husking. Others want a long ear, because they seem to fill the wagon faster, and will select this type regardless of the fact that the grain is shallow and the butts and tips poorly filled. Some will get seed from too far south, thus getting a larger variety than will mature well. Others will mix two varieties, expecting to increase the yield and combine in the cross the good qualities of both, while more often they will have produced a mongrel which has the undesirable qualities of both and is utterly worthless.

There is nothing that is more yielding to the hand of man in the way of selection and environment than the corn plant. The common plan in trying to improve corn is either to cross two varieties or by a series of selections from one sort. The latter is much the safest plan and is generally done through a series of breeding blocks, always keeping in mind the type you are selecting for.

Breeding blocks are small plots of ground selected where the most complete isolation may be received. The rows should be forty or fifty rods long and each one of the rows planted from a single ear. The ears and rows are numbered and the row number kept as the record of each ear. Weak or barren stalks are cut out so that each kernel will be pollenated by a strong, vigorous stalk. Every other row is detasseled the latter part of July or the forepart of August and seed corn selected from the highest yielding rows of this breeding block. A few of the very choicest ears from the few best rows are again chosen for use in the lenated by a strong, vigorous stalk. Every other row is de tasseled used in the larger fields. It will be noticed that some of these rows will make extraordinary large yields while others will make only a very ordinary yield. The corn can be husked and weighed each row separately. By counting the exact number of hills and figuring three thousand five hundred and fifty-six hills to the acre the yield per acre may easily be computed. The results of years of such selection should be the "survival of the fittest."

DAIRY FARMING.

John Behrends, before Calhoun County Farmers' Institute.

Mr. Chairman, Ladies and Gentlemen and Members of the Institute: Your secretary, Mr. Parsons, has placed my name on the program, to read a paper on "Dairy Interests."

Much could be said in regard to this, but while the time on our program is limited, and while the audience represents our Calhoun county farmers, and their respective families, I think it practical to start in at the beginning, that is, at the farm.

While every farmer in our county has one or more cows, we all know what milk is, and also know what a hardship it is for the whole family when "bossy" happens to go dry in the winter time.

While we all agree that enough milk and butter should be produced on every farm to supply the family with the cow's valuable product, and perhaps to have some to be sold at the store or exchange for other family necessities, this will not settle the question whether or not it is profitable to keep many milch cows, or, to speak in other words, become a dairy farmer.

I have frequently heard the question asked, Does it pay to milk cows, or to sell milk or cream to a creamery?

Sometimes the question is answered by no, and again it is answered by yes.

This may lead us to think somebody is wrong. While I am somewhat connected with our home creamery, I find that either one is right, in his own view.

Farmer A, who is first asked, says, No. In trying to find out the reasons why it does not pay to sell milk or cream to a creamery he tells you "I have no time to stop and explain these things to you creamery fellows, and you think you know this much better than I do, anyway"; and, "Get up," he says to his team and goes on. The creamery man is anxious to find out why Farmer A is not making money with his cows. He goes to his farm and finds about a dozen cows there. Farmer A has a good farm, nearly all dry land, except about fifteen or twenty acres of it is very wet. This of course is a pasture, and while the cattle in this pasture apparently have plenty to drink, there is not much for them to eat. The pasture has a few acres of dry land, but this happens to be in the further corner, away from the cow shed.

Farmer A and his family are all very industrious and busy from early in the morning until late in the evening, and when the time comes for milking everyone is nearly tired out, and the cows are on this dry spot, away from the yard.

The good-natured shepherd dog helps the boys, and goes and drives the cows home in great hurrah. One or two get stuck in the mud, but Chappy goes a second time, and finally gets them all. Now the cows have to be milked. Not a pleasant job; besides it is late. In order to save time next morning, the yard gate is closed in the evening, and it only takes a little while to milk the cows the next morning.

The creamery man is now convinced why it does not pay Farmer A to milk cows, and also knows the reason why his milk contains more mud than butterfat. In the fall of the year Farmer A finds his cows did not make him much money, and therefore has no mercy with them in the winter. The next season this very pasture has an abundance of grass. Farmer A had to bore a well and put up a windmill, and to his great surprise his cows did not give very much milk this season. He did not stop to think that it took nearly all summer for his cows to gain what they had lost last year, but is now convinced it does not pay to milk cows. While Farmer B is certain that his cows are making him good money, it is also much easier for the creamery man to get the desired information from him in regard to this. On his way home from Farmer A, he finds Farmer B cultivating corn. Both stop and have a little talk. Of course they talk about the cows, and farming in general, and Farmer B tells his good friend butter-maker, as he calls him, about the following: He first looks at his watch, and says it is 5 o'clock; I have just one hour yet, and I will tell you all about my little farm and the cows. I only have eighty acres. Over there (pointing toward the pasture) you see the cows; I have fourteen. The pasture is about twenty-eight acres. Joining the pasture on either end is about fifteen acres of meadow; always put on lots of good manure.

I have about twenty-five acres in corn, nearly all new ground, you see, and the oldest plow land—about ten acres—is in oats. Have seeded it this spring. Will break up a part of the pasture this fall. I always have good land for corn this way, and it does not take as many acres to fill my cribs as it does for my neighbor. Near the house I have a couple of acres for truck and garden stuff.

When fall comes I cut up about ten acres of my corn and the cows have plnty to eat in winter. Of course I have a nice warm place for them, also. I tell you, Mr. Butter-maker, I think just as much about my cows as I do about the rest of my family. My girls does the milking, but I do the feeding in the winter myself; cows and pigs, horses and chickens and everything. I tell you it pays to feed them good and to fix up good warm places for all of them. But I think, Mr. Butter-maker, you would like to know how much money we can make on our farm in one year. For the last eight or nine years, I find that each one of my cows has netted me at the creamery thirty dollars. In the fall my calves bring from eighty to one hundred dollars. I most generally keep about three or four of the heifer calves and always have young cows. This puts me in shape to sell off the older ones, so I can figure on selling one hundred and sixty dollars worth of cattle each year.

My pigs get fat in a hurry, for I feed them lots of good swill and grind their corn, mixed with a little oats. They mostly bring about two hundred and fifty dollars. Have not told you how much money the chickens bring each year. It is hard to tell exactly, but I am sure we sell over two hundred dollars worth of eggs each year, say nothing about the old chickens and the roosters we sell every fall.

Farmer B now looks at his watch again and says, Mr. Butter-maker. it is now nearly 6 o'clock; I have to unhitch and take the cows along with me; it is milking time.

We have now found that while Farmer A finds it does not pay him to keep cows for profit, our Farmer B, on his eighty-acre farm, is able to sell one thousand dollars worth of product every year.

Die Moral von der Geshichte, zu erkennen ist nicht schwer. Not every farmer can make dairying a success. The reasons for this are many. As a rule we find the man on a small farm is more successful in dairying than the one who is farming on a large scale.

To make dairying a success, even for the good dairy farmer, the following conditions must exist. He must have a good market for his product at all seasons of the year.

The road to his local creamery must be kept in shape, so that his product can get there. A good feeling between the creamery management and all his patrons must exist, and harmony.

For the latter the creamery operator is responsible to a great extent. He has to be a good butter-maker, has to know how to keep his machinery and everything in and about his creamery in first-class condition. But besides this, he has to have many other good qualities. He should be strictly honest, and do justice to all. Wherever he finds room for improvement, he should not hesitate to tell his patrons in a quiet way and not let his temper run away with him.

He should urge his patrons to assist in testing milk and cream, and in this way learn his patrons and make them familiar with all the details connected with creamery business.

This, I think, would do away with much suspicion. The more the dairy farmer gets familiar with all these parts, the easier it is for all to co-operate.

While our State Dairy Commissioner, Mr. H. R. Wright, and his assistant, Mr. P. H. Kieffer, are doing all that is within their power to improve and work for the interest of the dairy industry of our State, there is still lots of work that has to be left undone. It takes more help to do it. I therefore ask the audience, and especially the officers of the Calhoun county institute: Would it not be good policy to urge our Representative, Mr. J. H. Lowrey, to help to work with us along this line. If the legislature of Iowa would follow the good example of Minnesota in regard to dairy interests, I think it would be a great improvement for our dairy industry.

DAIRYING ON THE FARM.

H. F. Hoffman, before Cherokee County Farmers' Institute.

The subject of dairying on the farm is one that perhaps has received less attention at institutes held in this State than any branch of farming. Surely much less than any of equal importance, if indeed there is such.

As a class we have been slow to observe, and more so to grasp the opportunities along our line. Necessity has decreed that we should make use of the milk pail, from which there is no appeal. I do not mean that we all have to engage exclusively in the dairy business, but that it is bound to be one of the leading features of our farms.

Why, some may ask, do we embark in the dairy business? First, it does not take the ordinary person long, when he sees his neighbor or neighboring localities making money from some particular branch of agriculture, to fall in line. Although claiming we do not like to milk cows, and confronting ourselves with the argument that a person must be in love with his occupation to succeed, which, to a certain extent, is true; but when we can see good money in it, an attachment springs up and the love is forthcoming. On the other hand, no matter how deeply we may be in love with a certain business, once take the profit from it and a good share of the love will likely go with it.

We will admit there are some disagreeable features about dairying, but we believe it has as few as any branch of farming. The cattle feeder has his ins and outs, with a good sprinkling of the latter. The swine man smiles when corn is low and hogs high, and frowns when the cholera strikes his herds; while those engaged in raising grain for the general market need more sympathy than comment.

The modern dairy cow declares a cash dividend twice each month for her cream or butter, with an extra one a year for her calf, raised principally on her own milk, minus the butterfat. The calf can be turned off at a fair price by the time the pigs begin to need the milk.

While we are talking about profit, there is another point we should not overlook. People decline to milk cows but will buy tankage and blood meal at from forty to fifty dollars per ton, and stock foods at anywhere from one hundred and fifty to two hundred dollars per ton, to balance their corn, where the skimmed milk would do the work as well and much cheaper.

In support of the value of good separator milk for growing pigs we have as an authority the repeated and thorough tests of Professor Henry published in his hand-book entitled, "Feeds and Feeding", where without any guesswork he finds that with corn at twenty-five cents per bushel good separator milk is worth fifteen cents per hundred-weight. As in the past few years corn has sold for about twice the twenty-five cents, we will also have to double the price on skimmed milk. Nor does the profit stop here, for when we take into consideration the question of retainng or increasing the fertility of our soil, which we must do, as this is just as much an asset as the soil itself, the dairy cow cuts an important figure. In support of this we will quote from an address made before the State Dairy Association at Cedar Rapids in 1902 by no less an authority than Professor Curtiss of the State College, when he said: "In selling one thousand dollars worth of wheat from an Iowa farm at present prices we sell with it about three hundred and fifty dollars worth of fertility; in selling one thousand dollars worth of corn we sell about two hundred and fifty dollars worth of fertility, or constituents that would list the farmer these amounts if he were obliged to buy commercial fertilizers to maintain the fertility of his soil. But we can convert one thousand dollars worth of corn into beef, pork or mutton and sell it in that form and we reserve our two hundred and fifty dollars worth of fertility, or we can convert one thousand dollars worth of feed into butter and will not remove a single dollar's worth of fertility with it." This is something that we must not ignore, as we are not only robbing our farm of its fertility but ourselves as well.

I suppose the intention of the committee on the program was that the writer of this paper should tell you how to properly conduct a dairy, and we would cheerfully do so if we knew, but, to confess, we do not, as we are not dairymen, and our operations in that line are only secondary or perhaps worse than that, and even that is not conducted with the system it should be. Yet, there are a few things about it that we do know, and first is the importance of securing good cows, that is, ones that will give a fair quantity of milk, that will test well up to the standard. This is quite a difficult matter in a country where the tendency has been to produce a beef animal, as all we can do is to start in with the best we can get and breed up and weed out.

As the cow is only a machine and can not make milk, but simply has the power to convert the raw material which she eats and drinks into a finished product, it is apparent that to get the best results we must supply her with a ration containing the materials for the best product. For this purpose, outside of the grass season, by using clover hay and sorghum fodder, with a grain ration consisting of corn and oil meal, with half as much by measure of wheat bran added, and fed dry twice a day, has given good results. While this may not be as valuable as silo feed, or some of the commercial food stuffs, they are among the cheapest, and in our limited experience are most satisfactory. And if you will add to them good comfortable quarters, plenty of pure water and humane treatment, with a goodly amount of system in milking and caring for them, they will respond generously.

After we get the milk, what then? It has been often demonstrated that one person centrally located can care for fifty or one hundred dairies cheaper, and as a rule better, than can the fifty or one hundred people owning them. In solving this question nothing has played so important a part as the hand-power separator. In sending the whole milk to the creamery to be separated, no matter how close you live to the creamery, I believe it safe to say that the skim milk loses at least fifty per cent of its feeding value, and when it has far to be hauled in hot weather it will be much more. By this method of doing your own separating your cream is taken at your door, and paid for in cash twice each month, at so much per pound for the butterfat it contains, determined by test.

We do not believe, however, that there are many farmers who are capable of making a success of farming by confining themselves exclusively to any one branch, and so in dairying it becomes necessary to diversify to a certain extent. You are obliged to keep either pigs or calves, or both, to use up the skimmed milk and other by-products.

There is some team work, but not more than what a span of draft mares can easily do and raise colts, which usually brings in about the easiest money a farmer gets.

Taking everything into consideration, we are compelled to believe that the person who has a fairly good herd of dairy cows. even if he does not understand the business, but is anxious to learn, is in as good or better shape to withstand a siege of hard times and defy the red flag of the sheriff than those engaged in any other branch of agriculture.

I was somewhat surprised when our secretary asked me to write a paper on dairying, as I fully realized my incompetency, but have written my paper with the hope that it might provoke discussion and put some to thinking along this line, and also bring out the many details unmentioned. and thus fortify ourselves for the inestimable profit of dairying on the farm.

THOROUGHBRED CATTLE OF IOWA.

Carey M. Jones, before Scott County Farmers' Institute.

So many American farmers think because their grandfathers were opposed to pure bred cattle and their fathers talked against pure bred cattle that they are compelled to think that they are better off without them.

To some this is true, so far as the cow is concerned. Some men would be better off without any; and the cow would be better off without that kind of a farmer. But these individuals are far in the minority. Our grandfathers got along very nicely with the cradle and the flail. they got along because their tools were as good as their neighbors. and competitors.

But when the old McCormick reaper came along, they had to put aside the cradle as being too slow, just as the trusted steed was unhitched from the rattling stage coach to make much specific steam cars. When grass land was free, and the principal expense was branding and one bell for the family cow, then to have worried over the kind of steer that would have produced the greatest number of pounds of beef on the least number of pounds of grass consumed might have been useless.

But with the many advancements in machinery and science, equally rapid has been the development and settlement of our country, taking not Iowa, our own State, alone, for a basis, but the entire United States. Figures show the population as follows: 1800, 5.308.483; in 1850, 23,191,876; and in 1903 the population was 80,372,000, or practically sixteen persons to the square mile living in the United States. When there was but only one one hundred years ago, and possibly right here is where Bryan got his 16 to 1 idea. (Loud applause.) You may say that is a good while. Yes, but there are a few people alive today that were then, so that after all it is but a little more than the life of man. Again.

we have today, in round numbers, $1,000,000,000,000 when but fifty years ago we had but $7,000,000, the per capita wealth today being $1.235, when in 1850 it was only $307, and the total miles of good roads in 1902 was 202,132, against 9,021 in 1850.

Now it is to be understood that with all of these changes that there would be a change in the condition of the cattle of our country.

Where once there was a free range, today there are one hundred and sixty, eighty and even forty-acre farms, and towns; instead of seven, you have seventy dollars, and even more valuable land, and you must keep cattle or move off from your land.

PLEAS FOR GOOD STOCK.

Now, what kind of cattle will you have? Now, not to be blunt, stop the first school boy or girl that you meet and say, Johnnie, Mr. A. has five cows, and their calves will bring twenty dollars apiece at one year old, or $100. Mr. B. has one cow, and its calf brings $100 when it is one year old. Now A.'s five cows eat just five times as much as B.'s one can, and A.'s five calves as much as B.'s one calf. Which is the best cow to keep? You say that B.'s calf won't always bring $100? Probably not, but it will sell for $100 or over oftener than less. But say $60, then. You are saving the food of four head, and when B.'s pure bred calf is selling low, A.'s grade are bound to be selling very low.

You may say that is well for fancy breeders but not for a farmer. What is a fancy breeder? A man that breeds pure bred stock—and the most successful is the farmer who personally has the oversight of his own farm.

It is a well known fact that no scrub cattle pay and yet, like religion, not every man will accept it and breed pure bred cattle, but all must use bulls, and good ones, too. Someone will have to produce them, and the market is certainly established for them.

They require better care than some can give them? They do require good care, and they must have it, but was ever a dollar made by neglect, either from a dairy cow or a beef cow? If there was, how easy it could have been doubled by a litte good care.

Then there is another point that is not a minor one. Have you thought that you would like to keep your boy on the farm? Can you blame him for not being interested in the scrubs?

This is no more an age for scrub boys than it is for scrub cattle.

Get a few thoroughbred cows, give the boys something better than their neighbors, let the neighbors get equally as good as yours, and then the results will be both perfect and friendly rivalry and you won't be satisfied until you have some good mares and a few sows. And some fancy poultry.

A SON'S DUTY TO HIS FATHER.

H. J. Van de Waa, before the Sioux County Farmers' Institute.

Upon first thought we would be apt to say that the first duty of a son to his father is obedience. The only one of the Commnadments to which a promise is joined is the one which says: "Honor thy father and thy mother. that thy days may be long upon the land which the Lord thy God giveth thee."

But of course obedience in what is just must naturally be the result of honoring a father.

The subject naturally divides itself into three heads: First, to honor: second, to obey; and third, to serve. In all three respects sons of the present time seem to be greatly lacking, and still it is hard to say that the present time is worse than any former age has been. Certain it is that when the good old doctrine of "spare the rod and spoil the child" was more in force, the son found that he feared his father more than our present son does. This fear gave obedience, but this smacked more of the obedience of the lion trainer over his wild animals. It is hard for me to conceive how a son can honor a father who enforces obedience through brute force. One can fear a tyrant, but not honor him. And yet, believing that the Biblical command is binding, we believe that a father should so act towards his son that the son can honor his father.

We are sorry that so many sons show that they have very little honor for their fathers. The very term father is not often used. The endearing name of father, and "pa," are forgotten, and the son, among his companions, takes pride in speaking about his "dad," the "old man," or "the governor." "The child is father of the man," and such a son certainly shows by such expressions that he will not make much of a man. Also that he does not strive very hard to keep that Biblical command.

Based upon the very highest authority,—being in fact the basis of all existing law,—the law of God is certainly worthy of being heeded, and for this reason every son is in duty bound to honor his father. This honor must not, of course, go to the extreme of being ancestry worship, as it is among the Chinese, but one would sometimes think this preferable to the actions of many of our young men.

Now, how can a son best honor his father? How, indeed, better than by such actions as the very best people in the community will approve. To honor his father a son must be manly, upright, just, truthful and a lover of his fellow men. These traits we admire in a man, and in a boy as well. You need not be a "milksop," nor a "goody goody" boy; in fact, such efleminateness no one admires. You must not be brutal, sneakish, dishonest, nor one whose mouth is defiled by low, loud language, obscene utterances and billingsgate.

When you meet an honest manly boy you at once think that boy has good home training. By his very acts he is honoring his father. Actions go much farther than words. A boy may not be naturally bright, so as to make a high mark in the world, he may not be able to become a great scholar, he may only be a plodding, steady-working boy, and yet his honest and manly actions may, and often do, honor his father much more than the actions of your smart youth who smokes cigarettes, chews tobacco and plays "seven up" in the hay loft. I often feel sorry for many boys on our streets. They want to be manly; what boy does not? They observe men around them, and imitate them. In so many and many cases they imitate not the best men in the community, but the bully, the strong, swaggering bluffer, the braggart and the prize fighter. Whom he thinks he honors by so doing I do not know; certainly not himself, nor his parents.

The duty of obedience is one that a son must carefully consider. In childhood obdience is certainly required, and it is to be supposed that the father will only demand obedience in what is right. But say that as the boy grows up his father asks him to do something that is wrong. When the son is of an age when he can judge between right and wrong, a duty devolves upon him to refuse to do wrong. This refusal may not be, however, in a haughty manner, as if the father is the inferior. With due regard for the position of a parent, a son may refuse in such a way that a father can not take offense, and that his action may even prevent his father from doing wrong. If the action is doubtful, it should be debated in the intimate and confidential way that should always mark the relation of a father and son.

The question of obedience is a very hard one to settle. No rules can be laid down except the rule that one is never justified in obeying when ordered to do a wrong, or commit a crime. "I was told to do so," is no excuse whatever, in such a case, and does not take the punishment from you and put in onto another. "The fathers have eaten sour grapes and the children's teeth are set on edge" is not true in such cases. "The soul that sinneth, it shall die," is true, and we must never forget this. Each case depends upon itself, and must be judged alone. A sound judgment is very often resuired, and the son may not always be convinced that his duty requires approval or disapproval. The sensible father, in such a case, will aid his son to form a just opinion, and the son must strive to form it, for "the children of today are the men of tomorrow," and when they are men they will often be compelled to stand or fall on their own judgment.

But the duty to which I last call your attention is, it seems to me, the greatest of all. It is the duty of a son to serve his father. Not that this is not included in honoring, for it certainly is. Our laws fix a period when a son is free and entitled to his own wages. We do not object to this. To us service means much more than the giving of one's labor. One can be working for himself, and still in the highest sense of the word be serving his father. The service we refer to never ends until death severs all earthly ties. We heard a few weeks ago that an old man of ninety-four years of age came to Sioux City to have cataracts removed from his eyes. He was accompanied by his two sons, one seventy years old and the other sixty-four, who very carefully tended him. Here was a case of serving a father which deserves to be immortalized. When sickness and bodily infirmity comes, how beautiful to hear of filial services performed by a son who has grown to manhood. How terrible to hear in such a case the mournful tune of "over the hills to the poor-house."

We could write page after page on this subject. This duty of service is one of the highest pinnacles of high Christian living. It makes life beautiful. It makes life worth living. It is the ripe fruit of the beautiful flower of Christian charity.

We believe that it is to one who is negligent in such service that the words of Solomon apply most forcibly:

"The eye that mocketh at his father,
And despiseth to obey his mother,
The ravens of the valley shall pick it out,
And the young eagles shall eat it"

We believe that the hopes of the future of our nation depend upon the maintenance of the home circle, and we must add that the greatest stay in the home circle, the strong bond to perpetuate it, lies in the son observing his duties to his father.

CHILD CULTURE.

Mrs. J. L. Van Horn, before Humboldt County Farmers' Institute.

The subject of child culture has always attracted much attention, and is one to which much earnest thought has been given.

During the past few years public opinion has been undergoing radical changes as to methods.

When our grandparents were children they were trained on the principle that a "child should be seen, but not heard." The child's rights and privileges in the household were regulated in harmony with that idea.

Possibly the pendulum of time has swung a little too far in the opposite direction, for today no one will question but that the children are not only seen, but very much heard.

It promises well for the future that our public school system is claiming the attention of the wisest and most thoughtful throughout the world.

It is difficult to realize that less than a hundred years ago England had no free public schools. The masses were then purposely kept illiterate. The principle was reverenced as indisputable, "that the ignorance of the people was necessary to their obedience of law."

During the beginning of Queen Victoria's reign public-spirited men saw the pernicious results of this "reign of ignorance," and became impressed with the necessity for popular enlightenment.

Educators are still studying the problem—how to make the work of our schools more effective.

The child should not be subjected to the discipline of the school previous to the age of six or seven years. A too early forcing of the brain power is detrimental to both body and mind. Before this age is reached, very simple modes of instruction, by means of pictures or toys, may be used. But the attention of the young mind should never be held to weariness. Very gradually and gently indeed should the expanding intellect be led into the mysteries of learning.

The precocious child often reaches a dead level of reaction, where he pauses, while those who lagged behind him at the outset pass onward.

Fowler, the phrenologist, in one of his lectures made an examination of two heads. "This brain," he said, speaking of the first, "will soon give out, it ripens early, it is like the fall apple. While this brain," speaking of the second, "develops slowly, gathering energy for future ripeness and solidity. It is like the winter apple it will afford fruit long after the fall apple is gone."

A happy equilibrium is the most beautiful law of development. Cultivate symmetry by strengthening the weaker traits and using a gentle repression toward those that would otherwise shadow the beauty of character. Further on in school life the pupil should not be burdened with too many studies at one time.

We must not regard the child's brain as simply a receptacle into which a knowledge of facts is to be poured. This view of education is happily illustrated by Goldsmith—

> "And still they gazed, and still the wonder grew,
> That one small head could carry all he knew."

Were it possible for one small head to contain the whole realm of the known, no great benefit would result to the individual or to the race. He would be like the man who memorized *verbatim* one half of Webster's Dictionary, and so far as being of use to himself or to others, it was of no more value than the dictionary itself.

Facts and principles are to the mind what food is to the body. They are just as necessary to the growth of the mental structure as food for the physical body.

This instruction should be given just as judiciously and regularly as food is given. Lack of judgment in this matter accounts for many of the abnormal mental and moral developments all around us.

Mental stagnation is often caused by the "cramming" process, but I believe there are more who become mentally and morally stunted as the result of actual starvation—starvation of the mind. From a lack of proper nourishment the mind becomes like a sickly, barren tree, a prey for insects and noxious weeds, instead of bearing beautiful blossoms and delicious fruit, a joy and blessing to mankind, it becomes simply the dwelling place of disease, shedding its evil influence on all around. It is fit only to be cut down and cast out.

About four years ago the board of education in the city of Chicago established a permanent department of child study. The desire being to determine what was the average symmetrical development,—physical, mental and moral,—during the years from six to sixteen. Many interesting tests were made, comparing weight, height, strength, vital capacity and endurance, also the rate of physical growth as compared with mental.

These tests show a direct relationship between physical condition and intellectual capacity. They show that one is likely to attain to his highest mental development only as he reaches the physical growth that nature has marked out for him. Also that the vital capacity increases and decreases with the amount of one's activity; that vital capacity and endurance usually develop together.

In order to secure a broader basis for conclusions, tests were also taken on the boys of school age in the city prison and in the house of correction. The result was that those boys were found to be inferior in all the principal physical measurements taken, and that this inferiority increases with age.

This suggests to the parent that he should keep wide open the path of growth for the child by securing for him the best possible conditions of food, shelter and protection from disease. Everywhere it should be borne in mind that childhood should be sacred to growth.

As years crowd upon the child, as boyhood and girlhood succeed childhood, and the mind and body strengthen in happy unison, a stronger mind diet should be substituted for the simpler food of earlier years.

Seek to strengthen the entire group of mental faculties not the memory alone, but the reasoning, judging, discovering and inventive capacities. The inclination to original thought is oft-times discouraged. "What are you doing," asks the teacher of the young philosopher. "Thinking," says the boy who promises to become a Franklin or an Edison. "Stop it," says the teacher; "stop it and get your lesson."

Our schools should teach not only literature, science and art, but also how governments are made, and why they are made, and how they may be kept pure, and how the laws which hold them together can be regulated and controlled. That the youth of our land may develop the intelligence necessary for advancing civilization.

Thoughtful men and women realize that our present educational system is inadequate; that we are not accomplishing what we should for the money expended. They are discussing various methods for improvement. While the public mind is agitated on the subject of reform there will of necessity be some confusion of ideas.

Sooner or later the chaff will be blown away, the dust will settle and our State will devise a system more in harmony with our present needs.

You who have read the Des Moines papers of recent dates have probably noticed the demand made by the Mother's Club of that city for the sanitary improvement of one of their public schools. The life and health of their little ones was being endangered. The mothers rose in their might, several hundred strong, and insisted that the building be put in proper condition.

This is but an illustration of what can be accomplished when the people demand reform. There is too much indifference in regard to these questions. Many have not yet outgrown the idea that what was good enough for the parent is good enough for the child.

The Chinese nation has been following that policy for many centuries, with the result that they have been left behind in the march of progress.

Much, I repeat, can be, and is being, done in our schools for the physical and mental development of our children, but the foundations of moral training, whether for good or ill, are laid in the home life.

I once heard a mother speak to her child, who was reaching for some forbidden article. She did not say, "Stop that," or anything possibly more severe, but she quietly asked, "Mary, is it right?" That child was not more than "half-past two" yet the mother was already teaching her to choose between right and wrong.

Into the hands of woman, first as mother, then as teacher, has been given the work of molding the child-life. If her own mind and heart are filled with high aspirations and noble purposes, if she understands the true aims of life, she can not fail to bequeath the same spirit to her children.

Schools of all sorts are springing into existence cooking schools, kindergartens, training schools of various sorts, schools for the study of all kinds of literature and art, but the school having the highest mission—that of instructing mothers in the science of creating the moral and intellectual character of their children—this school has yet to be inaugurated.

If those who stand on the political rostrum today, preaching an ideal republic, would sound the keynote of the future, it is that the mothers of today are the true builders of that future.

HOW TO KEEP OUR BOYS ON THE FARM.

Mrs. John Carson, before Winnebago County Farmers' Institute.

During the past year there has been a number of articles on this subject published in the various farm papers, so one would naturally conclude it is a subject of interest to a goodly number of people.

It is a natural sequence for a son to desire to follow in his father's footsteps, and perfectly natural for a father who respects his particular avocation to desire to have one son at least follow out and further develop his line of thought and life.

If the father has achieved any degree of success, if he is able to make a living and somewhat of a competence, the son is quick to discern it and naturally from mere boyhood plans to be a doctor if papa is one, to drive even faster horses than papa does, and have them even blacker and shinier. The merchant's son turns his thoughts naturally to trade and merchandise and plans for a larger store and more business than papa has. Thus we have families of ministers, as the Ballou, the Emersons, the Beechers; families of merchants as the Stewarts, the Wanamakers; families of physicians, and likewise families of farmers.

The sucessful farmer's son, as a rule (of course there are exceptions to all rules), naturally turns to farming as a vocation; plans to be a better farmer than his father and sees visions of larger and better hogs, finer steers and more of them, improved machinery of all kinds and everything else in proportion. But if a son sees his father slaving on from early morning till late at night, if he realizes that he is denying himself all privileges of reading, of society and recreation; if he sees no positive improvement for the better from year to year; if he himself is dragged into the mill and made to hurry, hurry from dawn till dark, is it strange if he thinks "I'll get out of this," "I'll never be a farmer." So the man with his nose to the grindstone finds himself left in the cold, deserted by his sons and daughters and finally compelled to sell the farm or run it alone.

It requires brains as well as muscle and energy to run a farm. The wise farmer lays his plans shrewdly and carefully; maps out the details of his work masterfully; studies the arrangement of his barns and sheds with an eye to the greatest ease in doing the morning and evening chores. His little boys never realize that father has a hard time. They think it all fun. Then, as they grow older, and father takes them more and more into his confidence they realize that father does a good deal of planning to keep the old farm in shape, to turn out that fine lot of steers and the prize porkers, besides keeping garden, orchard and yard things of beauty and thus "joys forever." But still they never doubt but what they can do the planning too, when it becomes necessary, and with proper education I think they can.

A farmer's life is an ideal one where the work is well planned, where plenty of help is kept and where some pleasure is part of each day's program. One helpful and entertaining feature would be a farmers' club, limited to twelve families; the program to be arranged for a year in advance, meeting once a month at the home of a member and taking the whole family to hear the discussion, and incidentally having a good time. Topics of general interest could be discussed, such as "Women and the Pocketbook," "Shall a Young Man With Small Capital Buy or Rent a Farm?" Then, of course, add music and refreshments. It can't be all play on a farm any more than all work. There must be days and weeks of constant application during the busy season of the year. But knowing that it will not always last the sturdy boy takes delight in his ability to put forth extra effort in haying for instance, and eagerly watches to see which is putting in more loads a day, his father or Mr. Smith.

Boys also enjoy being taken into father's confidence and being allowed to help plan a little. Suppose a boy says in the evening, "What are you going to do tomorrow, father?" Well, sir, if nothing happens I am going to cut the grass on the south lot the first thing in the morning, and maybe we can get some of it in before night. You get up bright and early and have the team ready before breakfast." The answer is a cheery one. "All right." Another father in reply to the same question est delight in feeding and petting them. For are they not his very own? He has implicit confidence and the greatest pride in his farmer father. He has never heard of that man, possibly some of us have, who gave his son six pigs to raise because they were puny and sickly, but on market day, after these same pigs had been made saleable only by the strenuous efforts of a certain little fellow, pocketed all the money, giving the boy another sick pig. Boys like to have pocket money of their own. They enjoy it much better when they have earned it for themselves. They will be sure to spend it wisely, as, having earned it, they know and realize its value.

But, on the other hand, we don't want to keep all our boys on the farm. The wheels of the business morld would be locked in time, should we accomplish this, for the most difficult places are being taken everywhere by the sons of the farmer, and the rank and file of the world's most famous men are constantly being reinforced from our country homes.

WHY THE BOY LEAVES THE FARM.

Miss Mary Stockwell, before the Green County Farmers' Institute.

That many boys do leave their country homes to engage in other business is a fact which we can not deny. Adn perhaps this prevents stagnation of the current in the great sea of humanity. There never was an effect without a cause, and there must be some reason for this continual stream of country life flowing toward the towns and great cities.

The various reasons that come to my mind seem to resolve themselves under three heads, viz: First, on account of the work; second, on account of the social advantages and attractions of the towns and cities; third, on account of better business openings.

Some boys make up their minds to leave the farm on account of the work. Now and then a boy may object to the work because he is lazy, but these are exceptional cases. The average boy is active, full of life, and he loves to be doing something, but he must not be kept at his task all the time. We should remember the old saying about "all work and no play." No doubt it would be better for the whole family of the average farmer if the hours of labor could be shortened. In many homes by not planning out quite so much to be done during the season and using a little forethought each day perhaps the work could be made less; but it will be some time in the future, and still more labor-saving machinery will have to be invented, before we can reduce the hours of work to ten, nine or eight hours, as is the case in some employments. But, really, are not these long hours a blessing in disguise? Where will you find more perfect specimens of healthy, hearty boyhood and manhood than you see on the farm? For this very reason the country boy, accustomed to long hours of hard work, strong in body and brain, is often able to far outstrip his city cousin in the race for success in almost any line of work. We can all cite instances of armer boys who, beginning at the bottom, climbed gradually, but steadily, and by means of their own energy, perseverance and stick-to-it-iveness stood at last high on the ladder of fame.

Some object to the work because they are not interested in it. Now, we know that all men are not cast in the same mould. Tastes differ. All men would not do equally well at farming, and our civilization is far too advanced to demand that the son shall follow the same calling as his father before him. We leave room for the development of individuality, and if a farmer's boy shows more interest in the use of tools it may really be the best thing to let him be a carpenter or a mechanic; or he may have some other bent of mind which it will be wise to let him follow.

But, often the boy could be interested in the work of the farm if his father would take a little pains. Wouldn't he take more interest in stock if the father would give him a calf and allow him to care for and feed it, and even allow him to experiment with different feeds? Or, suppose the father gives the boy a colt and he cares for it and trains it as he pleases. Will he not take more interest in the field work if he now and then carries a load of grain or corn to market and is required to figure up the amount it comes to? Let him take the course in stock judging. Send in his name for Bulletins from the experiment station at Ames.

As the boy grows older and more capable and begins to have ideas of his own about farming, why not let hi mexperiment, or at least use his own ideas instead of being obliged to do just as his father has always done? I knew a boy who, after he became of age, wanted to try his own way of doing things, but the father said, "No, I'm running this farm, and although I am no longer able to work in the fields, I want things done my way—the same as they have always been done." "But, father," urged the boy, "let us try. Just rent the farm to us two boys for one year and let us see what we can do." But, no, the father wouldn't yield or give up his authority in farm matters, and the result was the boy left home.

If the farmer intends to buy a new corn plow, a new binder or hayloader, why not let the boy help select it? There are cases where his judgment might be just as good as his father's. Will not such a course arouse in the boy a more active interest in affairs and give him a sense of responsibility and of self confidence?

Sometimes boys get the idea that other callings are nobler or furnish greater exercise for brains. To rid them of these false ideas, farmers' clubs and farmers' institutes are a step in the right direction. Almost every class of workers nowadays have their conventions or gatherings of that sort. A teacher working alone and never attending institutes or conventions would not be half so interested in her work or so valuable to the school as one who, by attending such gatherings, has come to consider herself as not toiling alone, but one of a great army of workers in one of the noblest callings one can follow. Farming is a noble employment, too. It is said that "he who causes two blades of grass to grow where only one grew before has been by so much a blessing to humanity."

Another reason why boys leave the farm is the lack of social life. Farmers' sons should not be allowed to grow up mere "clod-hoppers." Some years ago I was told of a Greene county farmer who owned more than one thousand acres of land, but whose great, tall sons could scarcely read and never had been in Jefferson in their lives. They were bright boys, too. and when their father was reasoned with about the matter, he finally concluded to let some of the work go and give the boys a little chance.

There is not much excitement about farm life we must acknowledge, and it seems to many country boys as if life must be more enjoyable in town. In fact, it seems to him as if town life would be like one grand continual holiday, for many times his ideas of town life are made up chiefly from impressions gained on Fourth of July, Decoration Day or Saturday afternoon when the streets are full, or a trip to Des Moines at State Fair time. Plenty of life there and so many attractions. He does not realize how cruel that same city can be to a country boy trying to find a footing among the hundreds of others working for their daily bread.

Some young men think that town homes look nicer, more attractive. Sometimes they do, but why should they come to think of it. Many farmers can buy out their city cousins and have plenty left. And if these same farmers would make use of a little time and taste and thought, their homes might be just as attractive as any.

A boy likes a pleasant home where he can invite his friends to spend the evening in games or conversation. Then would it not be a good way to make him contented during these long winter evenings to furnish him plenty of good papers and books? Some good agricultural papers will give him ideas and pointers that will be of value to him. Then there are so many good books and magazines.

It is a grand thing for the boys and girls that our schools are paying so much attention to nature study. It will open the eyes of our young folks to see what wonderful things are going on around us every day.

Even a little knowledge of botany and geology would open the boys' eyes to see many things he did not see before.

A reading circle such as is maintained in at least one country neighborhood in Greene county, would provide some social life and be a helpful influence for both boys and girls. Some neighborhoods hold successful farmers' clubs. In some neighborhoods a course of lectures might be successfully carried out. All these things will help elevate the tone of the social life.

Our newly introduced system of rural free delivery is a wonderful help to the farmer, also the good roads which this system demands.

When the trolly car comes, as it surely will in time, it will bring the farmer in still closer touch with the town. While the horses rest he can speed along to the town to an entertainment or to spend the evening with a neighbor.

MUSIC IN THE HOME.

Mrs. L. B. Kinsey, before Greene County Farmers' Institute.

When the all-wise Creator formed this earth and set it in motion, when the morning stars sang together and all the sons of God shouted for joy, the earth was filled with music. Thus it has been ever since. If we fail to hear it, it is because of our dull ears and minds absorbed with other things. Ruskin says, "All one's life is music if one touches the notes rightly and in time."

Alas! I am afraid some of us are but making discords, with voice and hearts out of tune. Surely no one can deny the matchless music of nature. The rustling leaves, the sighing wind, the laughing water and the deep tones of the mighty ocean.

If God has so bountifully supplied us with harmony in nature, should we not try to have harmony in our lives and music in our homes? A home without music is incomplete.

Music is the natural language of the human race, understood and appreciated by all.

Music reaches the hearts and sways the masses as no other art. Music is ennobling, elevating and inspiring.

Ask the minister how he could preach without the inspiration of the sacred hymns. Ask the teacher what is the effect of music in the schools.

Then how much more we need music in the home, for cheer and comfort, for leading our thoughts from care and trouble to those things that will influence us for good and awaken within us the highest qualities of our nature.

I sincerely believe the time will come when a knowledge of music will be as essential as reading and writing. When it will be as much of a disgrace to say, "I can not play or sing," as it is now to say, "I can not read and write."

It is the ambition of the average parent of today that the daughter in the family should study music, and the boy can get along very well without any such culture. I think if there is anything ennobling in a musical education, let the boy have it. Surely he needs it as much as the girl, and I wager that he will do better work on the farm, in the shop, in the school, yea, even in the church, for knowing something of this divine art.

I wish I might persuade you to look upon music as something more than an accomplishment. Music is an education in itself. Then let us have more and better music in the home and it will be better in our churches and schools.

It is the greatest folly to suppose that our school teachers, who are doing for us such a grand work, should also teach music as a study. It is but the beginning of a movement for a thorough teaching in the home. Keep the music in the schools by all means, but the teaching to but a supplement to that taught in the home.

I wish I might persuade every farmer in the house to get his boys to work at a musical education. Don't tell them they may study music, but they must. Then allow them the time to study and practice. They will not all make musicians, but the time and money thus employed will be amply repaid you.

If you have no piano or organ in your home, then let me urge you to get one. Or, if you can not afford either, get something else, a violin, cornet, 'cello, or one of the many instruments suitable for the home and in the years to come you will see less demand for saloon and other demoralizing amusements.

Every town and community should have a good band, orchestra and choral society. If we as parents do our duty in encouraging our children along these lines, there will be less need for such questions as these: "How to keep the boy in Sunday school?" or "How to keep the boy on the farm?"

I feel that I can not close this paper without an earnest plea for the sacred music in our homes as well as in the church. If you say you have no talent for music, don't consider that it is a little thing to be able to play and sing those sacred songs that have been a help to humanity for ages past and will be for ages to come. What more beautiful sight than to see a mother gathering her little children around her and singing with them, "Rock of Ages" or "My Faith Looks Up to Thee."

Who can tell how many times the memory of the sacred songs learned in the home have in a moment of peril kept our children from evil.

So, if there is but one thing you can do, sing the songs of Zion in your home, and keep your soul in harmony with God.

And now I will close by quoting from an unknown author, but I think you will heartily agree with the quotation: "Music is at home a friend, abroad an introduction, in solitude a solace, and society an ornament. Music is God's best gift to man. The only art of heaven given to earth, and the only art of earth we can take to heaven."

SHARE OF THE FARMER'S WIFE.

Mrs. T. K. Black, before Greene County Farmers' Institute.

When your worthy secretary requested me to write a paper for the institute and sent me the subject, I read it, repeated it, and pondered. Could he mean a share of the husband's broad acres, or a share of the work to be done on a farm.

Well, as I love both, the share of the acres and a share of the work, and also know we can not expect a share of the former unless we, as farmers' wives, are willing to perform the duties allotted to every good helpmate, I concluded he meant both. I can hear some of the men saying, "Now for a sermon on women's rights." Not so. I believe in women's rights in one way and in another I do not. I would not care to vote if the laws were such as to grant me the liberty to do so. I believe a girl should marry right, then one vote counts as well as two. What is the use of a girl marrying a tippler, then turn around and want to vote to do away with liquor. She made her choice, let her abide by it. I heard a good mother, when counseling with her daughters, make this assertion: "Remember, girls, as you sow, so shall you reap." One of the wittiest and most careless ones spoke up and said, "Yes, ma, as ye sew, so shall ye rip, and as I grow older I think the latter maxim is most true to life.

I am straying away from my subject, but as this paper applies to farmers' daughters as well as to their wives, I thought it well to drop a little wholesome advice which may hel pthem in the future.

I believe in a share of the property dollar for dollar. Why not? Can any man give good reson why it should not be so? A farmer's wife performs the labor he can not hire; she loves to do it. Why do farmers leave the farm? They can hire the farming done, but who can he hire to wash and cook for his men? A woman can easily, with the modern household appliances, perform the labor required on a good sized farm. Say, for example, the good man of the house hires two or three men, more or less, as he needs them, and "all pull on the same rope," as the saying goes. A man grows well-to-do, and I'll add here, what is there to hinder with these good republican prices? Now here is where my women's rights would come in. If she lives and he lives she has the name of having one dollar to his two, but let her die first, and what has she to will to her children? Nothing. She can call them around her and give them her blessing, and there it ends. All is her husband's. I say "less name and more game." Now you have all the share I would have, namely, the power to claim one half and the right to will it to her children. I hope there are some ladies here, because I know the men will not want to listen.

Now as to the share of work for the farmer's wife, I do not think the work on a farm is done by shares. Sometimes a man needs his wife's help and she should help him if possible, for she, too, may need a favor, and then the men are ready and glad to help.

When a man marries and commences farming, and I'll say here no man can farm and make a success of it without a wife, he expects her to share his adversity as well as prosperity, and to do this and be a true wife to him, he should not keep his business affairs from her. When he has a payment to make she will be just as anxious as he to save and plan for it. How many times would women do entirely different had they known just how things were?

There is no life more independent than the life of a farmer's wife. She can plan for herself and family with her own money made from poultry and cows. Some will say a farmer's wife is a drudge. Not so. What is more healthful and life-giving than to rise early, attend to your duties, have your work done before noon and have a horse and buggy at your disposal in the afternoon?

Very few are the farmer's wives who do not have a horse and buggy to go when or where she wants. A farmer's wife whose husband rents has more money, and more privileges than the wife of a salaried man who works at fifty dollars a month. She can, if she is well and industrious, make more money with her cows and poultry than the salaried man can save in a whole year. Some will say, "I do not like to see women milk cows; no place for them." I don't think it is their calling either, but one should remember it was the "sharing of one another's burdens" when you were married. A farmer himself can milk three cows, let the hired men do the same (they will stay just as long) and if you have sons of your own let them learn. They marry sooner or later and who will milk then if they do not. I think every boy and man; and I'll say girl and woman, is better off in the end to have employment at home. Better your children at home choring than loafing about the streets and discussing every evil of the day. Who but a farmer's wife knows where her girls and boys are when bed-time comes You can not keep your children in a few square feet of ground, and in consequence they will get out and as they grow older they are more daring and bolder, until a woman in the town scarcely knows where her family is when night comes. What a worry, what a fret, if she be a true parent.

The farmer's wife can send her children out to play without any worry about their company. "Work has less victims than worry" and "love lightens labor." We have to either worry in town about the whereabouts of our family or be perfectly indifferent to their welfare. The latter I don't think a true good woman can feel. If our children are a failure in life what are we working for?

I would say in conclusion, had I my choice (and surely I had once) I would choose the happy, free, life of the farmer's wife. The wise man has truly said, "A merry heart doeth good like a medicine."

SUNSHINE AND SHADOW ON THE FARM.

Mrs. H. S. Greene, before Greene County Farmers' Institute.

Pondering as to the meaning of my subject and its application I turned to Webster and found the definition of sunshine to be "light of the sun" or "the place where it falls," the embodiment of light and warmth. Shadow "the absence of that light," to obscure from. In applying this to human life while we need the shine from that fiery orb swinging in space and without which we and this earth as it is could not exist. I take it my subject means more—something that shines from the heart, its abiding place.

Roll back the curtain of the past and let us read the record on the scroll of the centuries. Light—sun—"Son of Righteousness" here we have it. We see the star of hope shining over the birthplace of the Holy Child who, so the message said, would bring joy, peace and good will among men. By the brightness we can trace the boy Jesus to manhood when with all the splendor of that holy light a voice from the heavens spoke and formally acknowledged Him as the light of the world.

Easily can we trace him now by the throngs of people that are rejoicing because they have found the Great Healer whose busy life filled with intensity of that divine purpose, tried by temptation passed through the Gethsemane to the ocean on glowing Calvary's heights. Then that which means so much to us—the resurrection morn. Here was a life all of love given for others.

We can trace the influence of this life and teachings through the mighty march of the years that have passed since then down to our time. It has grown brighter and brighter until its light has almost mantled the earth and we see God working through human instrumentalities not only in thought but deeds.

Among the throngs of men gathered in groups, as it were, drawn by their mutual interests on the great business thoroughfare of life—ours tonight to treat only of the tillers of the soil—the very first occupation we have record of. If it seemeth to you that I find too much sunshine bear in mind the passing Christmastide when all hearts should be joyful and full of sunshine, again, because ours is the privilege to live in Iowa in this auspicious twentieth century.

Not long since I heard one say, "Oh! yours is such a busy humdrum life"—busy it is, I acknowledge, the most of the time. We think this business a blessing, for it gives earnestness of purpose toward the useful. But not "humdrum" for in no other line of work is there so much chance for variety and wide-awakeness as on the farm.

The rounded day of toil, in summer's heat or winter's cold is that which gives to the farmer such keen enjoyment of rest. 'Tis theirs the satisfaction of seeing as each day passes by some piece of work accomplished, some plan put in operation, as hand in hand with nature drinking in the sunshine and pure air, reading from her open book he learns the secret of her economy, of nothing wasted. We, with our agricultural college at Ames, whose fame has swept across the states, with its experimental farm for teaching our farmers the chemistry of the soil, successful feeding and breeding of stock, supplemented by our many agricultural papers, farming and stock raising need not be a mere matter of guess-work and failure is hardly possible. A shortage in the crops brings up the prices, and thus evens up things. There should be many sources of revenue on the farm. If there be a partial failure of crops it is only removing our goal—a home to be paid for or a certain amount of property gained a little farther away, that we may longer enjoy the anticipation. Even at this time are we not comfortably supplied, even though we may have to draw the reins of economy a little tighter. 'Tis meant for us to take a lesson from nature right here where she with rested and renewed soil, the next season brings forth a double yield.

Should there be suffering from a lack of food or clothing on the farm? No, with forethought and a little labor there ought to be an abundance of the necessities; and what more do we want? It is the simple, frugal mode of livng together with a real purpose in life that pays in sound bodies and rested nerves.

There is a healthy atmosphere around the "early to bed and early to rise" of a farmer's life that gives energy to a farmer's body and clear thoughts to the brain—to many, the independence of farm life holds a fascination. But about the heart of farm life there is comfort, happiness and rest. At the eventide hour when the hushed note of the bird is heard and all nature prepares for rest where goes the weary farmer? That divinely sweet thing called love hath entered his heart and from there hath flown until it found a resting place in another heart and they —two young men and maid—builded for themselves a home, a haven from the cares and strivings of the world. It is to be a center of happiness, of sunshine, no matter how humble its environments. There, man wearied with the labors of the day, comes for rest. Within such a home one becomes fortified against disappointments and troubles in their many forms and they are like the passing clouds that make the light seem all the brighter. The home is the anchor that steadies the dear ones on life's tempestuous sea.

The housewife's part, as Mrs. Black is prepared to show you, is no sinecure. Hers is the hand that turns the search light of love upon the gobblins of selfishness and strife that creep within the home, and to arouse and direct the latent powers of the child life. Mayhap some trifling vexations have left their trace upon her face and nerves but wit ha woman's will they are to be hidden behind a smile and a good meal when the men folks come in. Just here let the writer speak from experience, that nowhere will culinary skill be more appreciated and greater inroads made upon the supply on hand than on the farm. For, is not the best of everything to be found right here?

Then, when the day's work is done and the family gather around the fireside or evening's lamp, with new books, papers and magazines, of which there should be as an abundant supply as the means permit, and at the reasonable prices nowadays almost every one can have some; and with our much appreciated rural delivery to bring the mail to our very doors—who would live elsewhere than on the farm.

Added to this, the good education which tomorrow's speaker will emphasize, opening up our mental vision and enlarging the capacity for enjoyment, time need never hang heavy upon one's hands. Nto long since I heard one of our most practical farmers say that in his opinion the farm was the ideal place to bring up romping, have-a-good-time-as-you-go-along boys and girls, for there is a chance for the active brains and bodies of youth to find healthful exercise.

Another thing I must not forget to mention is the telephone, which Scranton and vicinity at the present time is greatly enjoying. It is such an excellent place to learn news items and keep in touch with your neighbors and markets that it is really a labor and time saving invention, requiring only a few moments to do a matter of business that without it would take as many hours. How we women enjoy it, for bits of social chat and greetings that are quite necessary to a healthy woman's existence.

Now, Mr. Chairman and members of the program committee, the only real shadows I can see are those that are made by sickness and death, and they come to the high, the lowly, the rich and the poor, in the business house or on the farm.

HOW TO MAKE HOME PLEASANT AND ATTRACTIVE.

Mrs. C. O. Ford, before Green County Farmers' Institute.

A single bitter word may disquiet an entire family for a whole day. One surly glance casts a gloom over the household, while a smile, like a gleam of sunshine, may light up the darkest and weariest hours. Like unexpected flowers which spring up along our path, full of freshness, fragrance and beauty, do kind words, gentle acts and sweet dispositions, make glad the home where peace and blessing dwell.

No matter how humble the abode, if it be garnished with grace and sweetened with kindness and smiles, the heart will turn lovingly toward it from all the tumult of the world, and it will be the dearest spot beneath the circuit of the sun.

The influences of home perpetuate themselves. The gentle grace of the mother lives in the daughter long after her head is pillowed in the dust of death; and the fatherly kindness feels its echo in the nobility and courtesy of sons, who come to wear his mantle and to fill his place. While on the other hand from an unhappy, misgoverned and disordered home go forth persons who shall make other homes miserable and perpetuate the sourness and sadness, the contentions and strife which made their own early lives so wretched and distorted.

To sum this all up in a few words, make your homes pleasant and attractive by kind words, gentle acts, sweet dispositions and cleanliness. Towards this kind of a home children gather "as clouds, and as doves to their windows," while from the home, which is the abode of discontent, strife and trouble, they fly forth as vultures to rend their prey.

To make a home pleasant and attractive it must first have a government, but love must be the dictator. All the members should unite to make home happy. We should have light in our homes, Heaven's own pure transparent light. It matters not whether home is clothed in blue and purple, if it is only brimful of love, smiles and gladness, and in order to have our homes such we must have our Sabbaths and family altars. Around these observances cling many of the sweetest and most sacred memories of our lives. Our boards should be spread with everything good and enjoyable. We should have birds, flowers, pets and everything suggestive of sociability. Flowers are as indispensable to the perfection of a home as to the perfection of a plant. But do not give them all the sunniest windows and pleasantest corners, crowding out the children.

Then, again, in our homes we must have industry and sympathy. In choosing amusements for the children the latter element must be brought in. To fully understand the little ones you must sympathize wth them. When a child asks questions don't meet it with, "Oh, don't bother me." Tell it all it wants to know.

Never let your angry passions rise, no matter how hired you may be. Always answer the little ones with kind and gentle words.

For full and intelligent happiness in the home circle, a library of the best works is necessary. Do not introduce the milk and water fiction of the present day, but books of character.

In speaking of home amusements we all know in late years a great change has come to the home life of the country, in the form of a great many games of skill and chance which are being played n our homes today, which were not known, or if known were forbidden by parents years ago. We know that chess of late years has captured for itself a high regard in popular regard. It speaks well for a people when an intellectual game can become popular. It takes brains to play chess even moderately well, and none but thoughtful and clever people would ever like it.

Checkers have fought their way into high life and whereas they once found their friends in the village tavern and in the farmer's kitchen they are now admitted into the parlors of the wealthy and refined. The games played with historical cards are also numerous, and many of them pleasantly exciting, and you find them in almost every household.

Now, all this is very pleasant and hopeful. It reveals to the thinker the fact that home life is more vivacious and happy than it used to be; that the long, dull evenings are being enlivened with stimulating amusements, and that the home circle now has attractions which at one time it sadly lacked. These games are helping to make the homes of the country happier; helping to make the children more contented with their homes, and in doing this they are helping to make the country more intelligent and more virtuous. By wise parents games are looked upon as Godsends. They help solve the problem of home amusements and recreation; and this, as all parents know, is one of the greatest problems they have to solve.

Parents, make your homes as happy as you possibly can for your children and their mates. Fill them wit hfun and frolic, and the cheerfulness of spirited social life. Play the games with your children and share their joys with them.

A great many homes are like the frame of a harp that stands without strings. In form and outline they suggest music, but no melody rises from the empty spaces, and thus it happens that home is unattractive, dreary and dull.

Let us hope that the pleasant games which try the wit and patience of the children and of the older ones as well, may become the fashion of the times until every home in the land shall be perfectly furnished with these accessories of profit and pleasure. For the children's sake let the reformation go on until every child shall have in his father's house, be it humble or costly, such appliances for his entertainment that he shall find joy and amusement under his father's roof and in his father's presence. "Home, home, sweet, sweet home. Be it ever so humble, there is no place like home."

Speaking of home amusements, the best is the good old habit of conversation. Talking over the events of the day, in bright and quick play of wit and fancy, the story which brings the laugh, and speaking of the good and kind and true things which all have in their hearts. It is not so much by dwelling upon what members of the family have in common, as bringing each to the other something interesting and amusing, that home life is to be made cheerful and joyous. Each one must do his or her part to make conversation genial and happy. We are too ready to converse with our newspapers and books, to seek some companion at the store, hotel, saloon, clubroom or bowling alley, etc., and to forget that home is anything more than a place to eat and sleep in. The revival of conversation, the entertainment of one another, as a roomful of people will entertain themselves, is one secret of a happy home. Remember this conversation should not simply occupy husband and wife and other older members of the family but extend itself to the children. Parents should be careful to talk with them, to enter into their life, to share their trifles, to assist in their studies, to meet them in the thoughts and feelings of their childhood. It is a great step in education when around the evening lamp are gathered the different members of the family, the older assisting the younger, each one contributing to the entertainment of the other, and all feeling that the evening has passed only too rapidly away. The time spent thus by parents in the higher entertainment of their children bears a harvest of eternal blessings, and the long evenings furnish just the time.

Another thing to make home happy is to cultivate singing in your family. Begin by teaching the songs you sang in your childhood. Mix them all together to meet the varying moods as in after life they come over us mysteriously at times. Many a time, in the very whirl of business, amid the splendor of the drive in the park or in the sunshine and gayety of the avenue, some little thing wakes up the memory of early youth. At other times, amid the rushing, mishaps of business, a merry ditty of the olden times breaks in upon the ugly train of thought, and throws the mind in another channel; light breaks from behind the cloud in the sky and new courage is given us.

The honest man goes gladly to his work, and when the day's work is done, his tools are laid aside and he is on his way home, where wife and children, the tidy table, and cheery fireside await him. How can he but have music in his heart to break forth so often into the merry whistle or lively song?

Mothers and wives do all you can to make your homes pleasant and attractive, by keeping them neat and clean; by having amusements for the evening; by having flowers, birds and all things that will add to the amusement of the father and children, and last but not least, make glad the home by kind words, gentle acts and sweet dispositions.

Fathers and husbands do your part by spending your evenings at home with your families, help to entertain them, in place of loafing up town or going to the neighbor's to enjoy yourself while wife and children are home. Or worse still, spending your evenings till midnight or later, at some place of amusement where you have to pay five, ten, fifteen or twenty cents, or perhaps more for a single game, while your little ones are in need of food and clothing. You will spend this money for a little amusement and then walk into the store and buy your tobacco and groceries on time, and if one of the little ones ask for something they are really in need of you will put them off by saying, "O, you will have to wait a while, I haven't the money now." Why don't you be honest and tell them you want to save what little you have in your pocket for your own amusement? Now, fathers, is that the way to make home pleasant and attractive? No. Are you setting a good example for your sons? No. Well, then why will you do so?

Now, parents, do you think your chidlren are yours to have and to hold for your own pleasure and profit? That you have a right to do what you will with them? If so, you are mistaken, they are but lent to you. Every child is but a sacred trust, a responsibility, than which there is none more mighty or sacred in life. Train up this child for me. I will require him at thy hands, says our Maker to every parent who receives a child. Judging by the declaration of inspiration. "Train up a child in the way he should go and when he is old he will not depart from it."

If we do our duty and bring up our children in a Christian home, and teach them the way of life eternal, our homes will always be full of pleasure and happiness, and we will be permitted to reach a higher destiny than that of earth.

There is a realm where the rainbow never fades, where the stars will be spread out before us like the islands that slumber in the ocean and where the beautiful beings that here pass before us like visions will stay in our presence forever.

WOMEN AS HOME-MAKERS.

Mrs. Mattie Stutzman, before Sioux County Farmers' Institute.

Your program committee greatly overestimated my ability when they put me on this program for a paper and failed to notify me of it until it was much too late for me to prepare anything of my own. If I were a preacher or a lawyer it would have been easy enough in the time I had, but I am neither, being only a home-maker, the best I could do was to put together in this paper the thoughts of others.

First of all I will give my ideas of a home.

At a meeting of the Woman's Club in a city not long ago, the subjects discussed were "the three things most essential to a home." An elderly unmarried woman said, that she considered a husband was the most essential of them all. So important did she consider this that she failed to mention the other two essentials. The rest of the women (all married) didn't pay much attention to her, thinking no doubt that the terms husband and home could not well be separated. A man's definition of home is, a wife, child, dog, book, pipe, gun and an ingienook.

The homes we are thinking of today are not up five flights of stairs in an apartment house in which no children are allowed but homes in Iowa, Sioux county, if you please. Those in which there is a husband, a wife and children; the pipe, dog and gun not being a necessity from my point of view.

It makes little, if any, difference whether the home is on a farm five or ten miles from town, or in a village or city, the responsibility is the same. The need of constant watchfulness and improvement in all directions is as great in one place as the other. The town home-maker has the advantage of the reading circle, and the country home-maker has the advantage in the cheapness of good literature, and the rural mail route. She is a wise woman who knows how to choose what will be conducive to her own mental growth, and not endanger the comfort of her home.

Perhaps some of you are thinking that reading circles and literature have nothing at all to do with home-making, but before I am through you will see that it has a great deal to do with it. A home, to be truly a home, need not be an elegant one with many servants, or filled with costly furniture. It should reflect the personality of those who inhabit it. It should be so permeated with their personality, that all who enter should feel it at once. We all know of homes in which a serene and cheerful spirit pervades the very atmosphere, and everything speaks of the ready hand, the artistic eye, and the thoughtful brain that has had the planning and arranging of it all. There is the gracious welcome, the true hospitality, the spirit of refinement and cultivation that have a lasting influence on all that come within its reach.

When the young wife steps across the threshold of her home she enters upon an experience through which she is to prove either her weakness or her womanly power, to win victory or suffer defeat.

Human beings, male and female, can not exercise the full power of their minds in the exclusive contemplation of their own affairs. So in order that the home-maker may not be dwarfed and narrowed by continually contemplating her home affairs, and that she may bring into her home a new brightness and cheer, a deeper sympathy and a broader understanding of the world and its conditions; that world in which her children after a few short years at home and under her immediate care, must go out into the world alone as men and women, she must know of other things than cooking and washing, and cleaning. If she does not know the good things, the bad, the wholesome, and the unwholesome things the children must meet when away from home, how can she teach them what to avoid and what to seek, or in what direction to use their influence to do the most good.

The time will never come when right-minded women will be drawn from their homes by wealth, power or politics. Queen Victoria, in her exalted and powerful position, was a model home-maker, a true wife, and a devoted mother. Mrs. Cyrus W. Field, wife of the great financier, supervised everything in her own home from the cleaning to the marketing, as do the women of the Vanderbilt, Gould and many other families.

The nations which lead the world have the freest women. The women of England and America have not lost their homes, and nowhere is the home better loved, or family life cleaner and higher. In proportion to the freedom of the women is the nation's growth.

It is claimed that higher education has the effect of diminishing the number of marriages, by raising the standard of women, and through the fact that their outlook on life is enlarged. If fewer girls regarded marriage as the one object of life, and find that making and receiving love is not the whole business of life before the age of twenty is reached, it surely is a gain in one direction. But if, through educative process, the intellect asserts its superiority to the heart qualities, and pure emotion s frowned down, all that the most finisned education has given can not make up for the loss. The girl who never dreams of having a home of her own and some one at the head of it whom she can delight to honor and love, is lacking in her feminine make up.

To some the home woman seems as one who might have fitted certain narrow conditions of the past, or certain prosaic ones of the present, but never the needs of progress. But the fact is, the needs of a home and the qualifications of a home-maker stand first in importance, for the home is the indispensable base and background of human life. We come out of it to do our human work, to act togteher for the service of society. We go back to it for that rest and comfort that is so essential to our health and happiness.

Human life needs large social contact and expression, but it cannot keep it up continually; it must go back for rest and refreshment to its base—the home.

So few women realize the possibilities for exercising the most thoughtful energies in learning to be a home-maker. Opportunities for developing scientific, intellectual and executive endowments to their fullest scope is as present here as anywhere. Her home can and should be the expression of her taste, and must prove the fact of her economy in time, strength and money. She must not feel herself superior to the most careful planning, nor reject the most trifling maens toward accomplishing success in her home management. She should be proud of her ability to make a "nickle" go as far as possible—but ought not be obliged to make one nickle do the work of two—and so oil the machinery of service that it seems to run itself. When the head of home affairs can arrive at this point of experience she has reason to be proud of her management.

It is possible for one who at the start did not possess the faculty of running things smoothly to become through training sure and swift of action that she can stand serene and happy, a very queen either in her kitchen or her parlor. The wife and mother who thus conquers does not reach the position without much discipline, many drawbacks and frequent discouragements. But if she keeps always that great and blessed end in view that, of holding the love and respect of husband, friends and children, and of making her home the best place on earth for them, she will win in the end; and the struggle to gain this end does not necessarily mean the sacrifice of any worthy ambition. It rests with the woman herself whether she shall stagnate or rust out intellectually and spiritually, or whether she shall extend the four walls of her home year by year into statelier mansions for soul and mind.

The home is the source not only of physical life but of all life. There the intellect is born as well as the body, and there its first training is received. In how many homes are the conditions that meet the tiny growing intellect favorable to its development? The stupidity and dullness of many girls and boys is directly due to their early home life. had the conditions there been such as is possible to secure by training and development by the father and mother, the dull mind would have been bright, the slow brain active and the stupid scholar intelligent. The mother—the home-maker—is the chief element in the home life. I do not ignore the father, as much can be said of his influence in the home for good or evil, but the mother is nearest the child. Hers is the dominating influence during the most plastic period of the child's life. Children take with them to whatever place they may be called in their majority the results of the influence (conscious or unconscious) of their mother. When we stop to think, we find that the home talk is one of the most potent influences in the world. It is powerful because it is the audible expression of the principles by which father and mother are guided. The father who swears, the mother who uses slang (not one of you men would tolerate a swearing wife) and whose voice is always pitched to the scolding key, will not occupy quite the same place in their children's hearts, will not be on quite so high a pedestal, as if their words were always pure and gentle. The parents should give much thought to this home talk. When they are truly wise and good they will. If one could control the language of every home in the land, they would be the world's master. All forms of expression, all human manifestation in every department of human activity, owe their character, tone and their texture to the homes from which they came. So the most thorough education, the most brilliant gifts, the most fascinating personality, are not too much to bring to a home, and the investment of wealth of heart and mind will insure rich returns to the sacred spot where love and service go hand in hand.

The home woman may be the happiest, the proudest and wisest woman in the world if she first tries to understand the nature and importance of her position, and will bring her faculties and powers to the grand purpose of making all that is possible of the one sacred spot from which influences radiate, that will multiply widely and forever.

WOMAN AS A MONEY SAVER.

Mrs. H. H. McKee, before the Sioux County Farmers' Institute.

As a money saver, woman on the farm has a wide field. We all know the adage, "It is not how much a man makes, but how much he saves that makes him wealthy." A man cannot be a money saver unless his wife, or whoever is mistress of his home will assist him, for a woman can throw out more than a man can bring in. A man will be no better than his wife will allow him. In saving, the mistress of the home has untold influence as well as in many other matters. She may not always save by buying the cheapest article to be had, but always purchase a good article, for a cheap one is dear at any price. This is true whether buying food, clothing, cooking utensils or furniture.

Of course the woman's sphere is in the house, but she may be of use in other places if health and household duties will permit. Right here let me say, that I believe women are robbing themselves of many pleasures and I believe it is a duty they owe themselves as well as their families to spend a little time every day in the open air, for it is conducive to good health, and that in turn adds to the happiness of the woman, and so much of the happiness of the home depends upon her condition.

As far as possible keep everything about the home in good repair, and this is a means of saving, for things kept in good repair will last much longer.

Take good care of everything about the home; if accidents occur, if things are broken, repair them as soon as possible. Don't be afraid to use a hammer, saw and nails, for you may be able to mend an article in a few minutes which if used in a broken condition would be ruined.

In the care of food, great care should be exercised, for by neglecting them they become unfit for use. The farmer's family can have a greater part of their living with but very little outlay by careful planning and forethought. They can enjoy the first spring vegetables and fruit, as they may be had quite early if planned for. Some of the seeds may be sown in the fall, and come up much earlier by so doing. If the garden is plowed in the fall it can be cultivated much earlier, and some time gained thereby. All these things are a help, and it is the little things that count up so fast.

The same may be said of clothing as of utensils and furniture. Give it the best of care and it will last much longer. If rents are made or places worn do not wait until great gaping holes greet you, when the mending is a formidable task, but remember "a stitch in time saves nine." I think the saying should be, "a stitch in time saves ninety-nine," for it often does.

I know for the busy housewife it is almost impossible to keep everything up as it should be, and it is so easy to neglect the mending basket, but by making an honest effort we can accomplish much. According to my way of thinking, it is a saving to place everything in its place as near as possible, as it proves a saving of time, strength and nerve force.

To have a good supply of simple remedies and know how to use them will not be a loss, and will very often save a doctor's bill. Now I do not mean to try to prescribe in the place of a physician, but in case of colds, etc., if taken in the beginning the disease is much easier cured, or at least held in check, than if allowed to get a good hold.

THE NEED OF DOMESTIC ECONOMY IN THE PUBLIC SCHOOLS.

Mrs. Alice Merritt Parks, before Grundy County Farmers' Institute.

Education has been making rapid strides in the past few years. The old system in which students left their colleges and universities capable of thinking in terms of "a" and "b," and with seven different languages on their tongues, but incapable of *putting* their knowledge into work is rapidly giving place to a system more practical in its teaching.

One of the greatest objections to the college trained men in past years has been the fact that they are not fitted to take their place in this busy workaday world. The same tendency has prevailed in our public schools, with the result that the pupils are not able to grasp the abstract truths taught, and consequently drop out of school at an early age. Certain it is that something must be radically wrong with an education of this kind. Men have been quick to see the deficiency, but it has taken some time to see the remedy. Now, a change is slowly but surely taking place and the abstract method of teaching is giving place to one in which the studies are related to the life of the pupil. As a result, agricultural colleges, technical and manual training schools have sprung up all over our fair country, but the end is not yet. These schools train their pupils not only in such studies as tend towards a cultured intellect and a broader knowledge but in the work of their hands. They are taught to express their thoughts in their work and when they are through with their course they are ready to do something.

"The object of all education is to prepare men and women for the duties and pleasures of life. If a purely intellectual training secured these ends, there would be no need to ask for technical training, but it does not. In all countries the great majority of the people must labor with their hands as well as brains, and when the training of hand and brain goes together the result will be most satisfactory."

Mr. C. M. Woodward says: "Our students must come out of school with elements of high character, with vigorous, healthy body and mind, able to put both hand and brain to work. Practical accomplishments are essential to a good education, although not the whole of it."

But the subject in which we are interested is the education of our girls and the part they are to play in this new education. The manual training which is given to girls at the present consists almost exclusively of cooking and sewing. It has taken many years to overcome the objections which have been raised when the question of adding these branches, as well as other forms of manual training, to the course in our public schools. The school boards have been slow to accept the new order of things and this is as it should be—the school life of the young people is too precious to be wasted in experiments that have not been carefully thought and worked out. But when these boards are convinced that a special branch of manual training is for the good of the pupil and for the public, and can be introduced into the schools without detriment to the usual studies, they have done their part.

Two of the strongest objections which have been offered to this kind of work are: First, there is no time in the already crowded course for these studies and second, that it would lower the standard of intellectual education.

Let us consider these questions and see if they can be met. The first question which naturally arises when this subject is brought up is, "Are there not already too many studies in our public school courses? If domestic science is better than something else in the course and will fit a girl for a higher and nobler life it should be given a place even if it means the omission of some other study. The school life of a person is short at best, and only the studies which are going to help in the life work should be included. There are many useless things in the course today,—many things which to the student carry no meaning, which have no connection with their life. Instead of this useless cramming of facts, let us apply these facts to the life of the pupils. Give them science with practice and these facts when applied to the work they are doing daily will give them a new meaning as well as add new dignity to their work. Then for the final answer let us turn to the schools which have adopted such a course. It has been demonstrated that the girls in grammar and high schools will spend two or three hours a week in the school kitchen without any loss in their other studies. This is the unanimous verdict of all schools having adopted it. The work comes as a diversion and relieves the mind from the strain and worry caused by purely mental work. It also gives them something to which they can link their other studies, for there is scarcely a branch taught that does not apply, either directly or indirectly to domestic science.

The second objection—that it would lower the standard of intellectual education—has also been met and answered by experience. Provided always that it is given on scientific principles, and in the right proportion, it is found a help to mental progress instead of a hindrance. A prominent educator says: "The change of thought and physical exercise starts the blood in a healthful circulation and brightens and strengthens one's mental faculties. Every study which a person takes up should be worth infinitely more to him all through life because it will become a living thing to him in connection with the work of his hands." * * "It is a sad fact that the pupil who begins work at the end of his course, begins to lose the knowledge acquired, there in that course, which has no visible connection with his work. Thus in a few years it has faded almost entirely away. If, however, the pupil had received enough manual training to demonstrate the scientific principles which he was taught he would retain his scientific knowledge and use it through life. A close relation between an intellectual and practical training must of necessity elevate and strengthen the mind."

The importance of domestic science in the education of a girl is very great. Her whole life, as well as the lives of the generations who come after her, will be influenced by her knowledge or lack of knowledge of this subject. It is in the homes of this nation that her power lies. It has been said that poor food is the cause of more deaths than alcoholic drinks, and who can estimate the bad tempers, the fretfulness and general discomfort and misery which is in multitudes of our homes today—the direct result of improperly nourished bodies. It is a recognized fact that insufficient or improper food is responsible for much of the intemperance in the world. And not only our health and strength is dependent upon the care we give our bodies, but our intellectual life, and even our morals are directly dependent upon the same course.

If then, so vastly much depends upon the food we eat, and the homes in which we live, how important it is that the women who have this work to do be educated in housekeeping and home-making. They should be able to supply their households with food which is nourishing—which not only sustains life but meets the requirements of that life and builds up the part which needs it most. She should be able to choose her food intelligently and economically and to know when she is buying it just what its value is in terms of bodily vigor. She should also be able to look at her house from a sanitary standpoint and recognize the importance of attention to small details connected with the planning of a house, the disposal of all waste matter, its heating, lighting and ventilation as well as its cleansing.

Moreover, she should be able to clothe the body in such a manner that it is pleasing to the eye, and at the same time not forget the comfort necessary for every active person.

"Why not let them learn these things at home?" do you ask? That may be all right in theory, but they do not learn them at home. "There are still old-fashioned homes, mothers and daughters, but there are increasing numbers of children, both of the poor and well to do, who for one reason and another are not doing things at home, and in face of the serious results of such a condition it would seem to devolve upon the school to supply the lack.

Another question which has arisen is the place where such instruction should be given. Nearly all of the agricultural colleges throughout the country have courses in this work, as well as many of the colleges and universities. This is all very well as far as it goes, but only one girl out of every five hundred in America enjoys the advantages of a college education, and shall the four hundred and ninety-nine be deprived of this work? Certainly not. The place for the teaching of domestic science is in the public schools, and in response to this need many of the grammar and high schools in our cities have a thorough course in cooking and sewing in connection with their other work. The work has been in operation long in the colleges of our country and it has been very successful. To give you an idea of the work which is being done along this line, I would like to tell you of our work at Ames. The work we are doing there ought to be understood by the people of our State for the college is the people's college—your money helps pay the expenses of that college and we want you to know how we are using your money. We want you to understand the work you are supporting and we would be very glad if you might visit our institution and see these things for yourselves. There are two courses offered young women who wish to take the work in domestic economy. One a four-year course, the other a two-year teacher's course, designed especially to meet the needs of those who have had previous training in college work and who wish to teach this special branch. In the four-year course the cooking and sewing are given alternately throughout the whole course, one term being devoted to cooking, the next to sewing, etc. In the freshman year the girls take up the study of foods from the standpoint of their composition, nutritive value, digestibility and cost. In the laboratory work they are taught to prepare some of the simpler dishes in the best way, and are given experimental work to determine the effect of different temperatures upon the different food principles, and the principles of cookery.

In the second year the girls take up the study of home sanitation. In this work they learn what things should be considered in choosing the site for a house, ho wit should be protected from dampness, what constitutes a sanitary cellar, study the different methods of heating, lighting, ventilation, etc. They also make a study of the different rooms in the house, with a special study of the kitchen and dining-room, the utensils used in cooking and the general care of a house. In the laboratory work the cooking is all done with reference to serving. Breakfast dishes are prepared during the first instructions, then a lesson is given in setting table, waiting on table and serving a breakfast. The girls cook a breakfast, then set the table in the dining-room and serve it to the girls in the class. In the same way, luncheon and dinner dishes are prepared and these meals are served.

In the junior year the girls take up more advanced work in the study of foods. They are also given dietary studies and are taught how to determine whether a food is a good one or not, and to compare the relative value of foods.

In the laboratory, canning, preserving and pickling fruit is taught, also more advanced cookery. Their serving lessons are put into practice and the girls cook the meals and entertain their guests.

In the senior year, special work in home nursing is given. A trained nurse gives a series of lectures on the care of the sick, bandaging, poulticing and so on. A study of the diet needed in different kinds of disease is made. The laboratory work goes hand in hand with the class work. There they are taught how to prepare and serve attractively dishes for invalids. Later in the term they are given a number of lessons in chafing dish cookery and confectionery. The same term work is also given in laundering. A study is made of water, the method of cleansing, soap and its action, blueing and bleaching agents, etc. Practical work is also given in washing cotton, linen, silk and wool, as well as the removal of stains, etc.

The course of sewing alternates with the cooking throughout the four years. In the freshman year the girl becomes familiar with all varieties of stitches in hand sewing. She makes for herself a set of models, including the various stitches, seams, hems, fastenings, also patching, darning, lace making, etc.

In the sophomore year each student plans, cuts, fits and finishes a suit of underwear for herself under the supervision of the instructor.

In the junior and senior years, drafting and dressmaking are taught. The student designs, drafts and makes for herself an unlined cotton dress and a lined wool dress. This course also includes instruction in millinery—the principles of trimming, the knowledge of materials, wiring, making frames, lining, etc. Instruction is also given in Raffia work, woven and sewed basketry. Lecture work is also given each year, including a study of fabrics, their properties and values, as well as the process of manufacture, history of tapestry and rug manufacture and historic costume.

A course is also given in history, art and home decoration. The principles of ornamentation and color are applied to the furnishings of the home, and to the treatment of walls, floors and ceilings. This work is illustrated by photographs of architecture, sculpture and by paintings, by specimens of textiles, wall papers, pottery, fine glass and silver.

Besides the work in domestic economy regular college work as it is given in any scientific course is pursued, including algebra, geometry, trigonometry, chemistry, French and German, elocution, physiology, physics, ecology, history, literature, geology, political economy, bacteriology, zoology, entomology, psychology and ethics. Thus giving the girl a well rounded practical education, which fits her for work in life.

The two-year course is offered especially to those who expect to teach domestic economy in schools and colleges. It takes up the study of domestic economy as it is given in the four-year course with the addition of a year of the theory and practice of teaching. In this work the planning of courses for public schools and colleges is made an important feature with a study of the equipment and cost of such departments. The girls also give demonstration lessons to which the ladies of the campus are invited. Practice classes, consisting of the children of the professors are taught by the girls. The courses are planned by them, and the buying and teaching is done by them under the strict supervision of the instructor. In this course only those sciences which relate most closely to domestic science and upon which it is based are studied. Chemistry is taken throughout the entire course. Physics, botany, English, physiology, psychology and bacteriology are also studied.

The aim of the work in domestic economy at the Iowa State college is to bring intelligence and scientific knowledge, as well as manual skill into the work of home-making. To impress upon the young woman the fact that the work of the home is not only worthy her best intelligence but may be made very attractive and enjoyable as well. When a young woman finishes the course she leaves the college better fitted for the duties by which she will be confronted and better equipped to minister to the comfort and well being of others, wherever she may be or in whatever occupation she may be engaged.

I wish I could make you feel the need of this work as I feel it so that when you leave this place you will be a thorough convert to a domestic science education for girls and that your influence will be the means of establishing this branch in all of our public schools.

POULTRY ON THE FARM.

Mrs. O. W. Browning, before the Jasper County Farmers' Institute.

We shall begin by giving a few statistics in regard to the poultry of our own State and county.

The total number of chickens in the State in 1900 was 18,907,673; turkeys, 424,306; geese, 223,612; ducks, 487,752; an average of 9½ fowls for each person in the State.

Value of all poultry raised in the State in 1899 was $9,491,819, making an average of $95.86 per county.

Eggs produced in the State in 1899 were 99,621,920 dozen; value, $10,016,707. Of this enormous amount of poultry raised in the State, there was but one county (Linn) that surpassed Jasper county, the number of fowls in this county being: Chickens, 235,273; turkeys, 5,490; geese, 2.541; and ducks, 7.112. Value of poultry raised in Jasper county in 1899 was $153,960.

There were nine counties that had a greater number of eggs than ours, though our county had almost 400,000 dozen more than the average for the State, which is 1,006,282 dozen, our county having 1,403.980 dozen.

When we note the fact that all this property is exempt from taxation we surely have no cause to complain of the poultry industry although it is usually considered by farmers to be of minor importance, "something for the women to do;" yet we find by comparing statistics that the poultry industry is not far behind other interests on the farm.

One thing in favor of poultry is the fact that "they scratch for their living," at least six months in the year, and by so doing pick up grain that would otherwise be lost, besides destroying many seeds from different weeds and eating innumerable destructive insects. Some poultry raisers claim that chickens can not be fed to excess, by becoming too fat to lay; others that they can. That may depend largely on the breed and surroundings. My experience has been that they may be overfed, especially when closely housed in cold weather. This may be avoided by judicious feeding and plenty of exercise obtained by allowing the hens to scratch for most of their food, which they do most willingly. The happiest, most contented creatures to be found are a flock of healthy, singing hens, digging after the grain of wheat, oats or corn that they are sure to find among the straw.

A few of the essentials to success in poultry raising are, regularity in feeding, a variety of sweet, wholesome food, with sufficient exercise in fresh air; protection from storms and cold winds by having a substantial, well ventilated building in winter and an abundance of shade in summer and plenty of fresh water and sweet milk.

In speaking of the care and management of chicks, I shall give a few plans from different breeders. I. K. Delch's bill of fare for chickens is: First meal after being taken from nest should be, boiled eggs chopped fine, shells and all; also baked corncake crumbled into scalded milk. No fluid as drink but the scalded milk.

One lady advises never to give chicks over 20 per cent corn, and until four weeks old no corn. The food given under her system is small seeds, cracked grain, animal meal and sweet milk, a good supply of chick grit and bluegrass range.

The result of inquiry from fourteen ladies in regard to feeding young chicks is as follows: Two, feed corn meal moistened with cold water; two, bread soaked in water or milk; one, hard boiled egg with pepper added, afterward soaked bread; nine, use dry feed, bread crumbs, oat meal, dry corn meal, with prepared chicken food, plenty of grit and water and milk. All warn against overfeeding. A variety of food is usually recommended. Most people do not feed chicks until they are twenty-four hours old, and some advise waiting as long as seventy-two hours. Young chicks should be fed often and sparingly. Nature's way is surely good, and that is, a seed here, a bug there, a sip of dew or water, a tiny grain of sand, a bit of charcoal, a blade of grass or clover leaf, a bite of fresh strawberry or other fruit, and so on the day through. At night the young chick has had a great round, following the mother hen, who tries very hard to find all the good things possible for her babies.

Most poultry writers bring out quite strongly the need of a variety of food, as we all know that poultry as well as ourselves should tire very soon of one thing to eat morning, noon and night. The only hindrance here is the fact that farmers as a rule are careless in providing these different grains. A small piece of millet and wheat should be sown even though the men think they can not spare the ground which they must have for corn.

Hens are fond of eating in a small rape patch, and a plot of sunflowers makes an excellent shade in summer, and the seeds if fed sparingly in winter are good.

I believe every farmer, next to a good warm hen house, should provide a large cave in which vegetables of all kinds may be stored for the winter's feed. Too many farmers think any kind of a building is good enough for the hens, but they are gradually becoming convinced of the fact that there is money in poultry, and when they see the money side they are ready and willing to improve surroundings.

A good supply of clover should not be overlooked, as hens are very fond of clover as a winter feed. Plenty of dust should also be provided. Culling should not be lost sight of. The pure bred scrub in poultry is equally as dangerous as in any other farm stock. We oftentimes look and hesitate too long before we market or use ax on inferior birds. Unless we exercise the greatest care we will be troubled with various diseases, as roup, cholera, scale leg, with probably other troubles.

There are dozens of remedies for mites and white lice, but prevention is best. Coal tar painted over the walls and perches is claimed to be death on mites. Kerosene emulsion is also claimed to be good as a dip for white lice and as a spray for mites.

Various remedies are given for cholera, Venetian red in drinking water, or a small amount of copperas or camphor gum. One lady uses common soda and a spoonful of lime in drinking water with good results.

The poultry business is an honest and independent one, and there is money in it if rightly conducted, though it requires courage, carefulness and much time and labor.

Of course we can't all be farmers and poultry raisers, nor do we wish to be, as country life is not all roses and no thorns, but it is a more simple, natural, healthful life, and if we wish to make a real success of poultry raising or any other business we must gain all the knowledge possible from others, and as Josh Billings says: "It strikes me that it is a great deal cheaper to learn from other folks' experience than to let them learn from ours." Then, use good common sense, and if we are really in love with the work we are sure to win.

Following I give you a few excellent papers and addresses delivered before the Eighth Annual Meeting of the American Association of Farmers Institutes, Toronto, Ontario, June 23–26, 1903.

HOW THE INSTITUTES CAN BRING THE MOST GOOD TO THE GIRLS.

WOMEN AND THEIR SHARE IN THE WORK.

MISS MADDOCK: Ladies and gentlemen, I have listened with a great deal of pleasure and interest to the papers and suggestions presented here during the last few days, but I have been somewhat disappointed that more has not been said in reference to women's work. I had hoped to learn a good deal with regard to this class of work in the different States in the Union, but so far as I can judge no definite women's organizations are in existence there. I may be speaking too strongly, yet that is my impression.

I find that in the institutes of Ontario the subject how to bring the most good to girls in our institute work has been largely overlooked. I find that comparatively few girls attend the meetings. When asked to do so the usual reply is, "Oh, I don't want to hear anything about housekeeping; I hate it." If we can not induce the young girls to attend the meetings of the institute, is it not well to view this subject from another standpoint? If we can not induce them to attend and be directly benefited by institute work, we must consider the indirect benefit that girls may receive by having the mothers become members of the institute.

That women are narrow in their methods of housekeeping is, I think, accepted as a fact. They have followed the methods of their mothers and grandmothers, without applying new methods to new conditions, until the daughters in the home have become discouraged. They have said, "If this is housekeeping, we want none of it." Consequently they have taken positions in factories, stores and offices—any place to get away from the home.

As I have said, it seems to be acknowledged as a fact that women are narrow in regard to their methods of housekeeping. How often do we hear the remark from men, "If you want to offend a woman, tell her someone else can cook a dinner or keep a house as well as she can?" Now I think such a remark is a great exaggeration. In my observation I find that a very large class of women, at least in the Province of Ontario, are only too glad to learn—are anxious for anything that will help them in their methods of housework. But we must admit that there is an element of truth in the remark. Before the organization of women's institutes, women had no opportunity to meet with other women for the purpose of discussing home methods and plans of housekeeping. It is true we had church missionary societies, ladies' auxiliaries, etc., in abundance; and these have been helpful to women so far as they have gone. That is, by the women of the different churches meeting together and discussing plans of helping those less efficient, their broader sympathies and more generous feelings are drawn out. But we have church cliques and "sets." Presbyterians meet by themselves, Methohdists by themselves. But in such an organization as a women's institute, we meet on the broad platform of the home and home interests. Women of all denominations meet to discuss anything that is of interest to the home—women's first interest and greatest responsibility. From what I have heard of the way in which the women of all denominations have been brought together through this organization, I believe that it has done a work that no other women's organization has been able to accomplish.

By broadening the minds of the mothers—by showing them that their plans are not always the best—by doing away with that spirit of unkind criticism of the plans and ideas of their neighbors, the effect is that little girls, ever quick to catch the spirit of the mother, are unconsciously removed from that atmosphere of gossip and jealousy that has always been so unfairly considered woman's prerogative.

HELPING THE GIRLS THROUGH THE MOTHERS.

Another indirect benefit: If the mothers by meeting together become better housekeepers, are shown the necessity for pure air, plenty of sunlight in the home, the necessity of well-cooked, nourishing food, adapted to the requirements of the family, to the seasons of the year, and the occupations of the different members of the family; if at the same time they can be shown that much of the food with which the tables in the country so often groan is unnecessary, neither helpful nor conducive to the higher refinement of civilized life; and if we can induce our women to take a part of the time spent in the kitchen in baking pies and cakes and give that time to rest, entire rest, or self-improvement, so that they may be better fitted to take their rightful place, that of instructors, directors, counselors, companions of the members of the household; if our young girls, brought up from early childhood in this way, were taught these new views and ideas of the methods of housekeeping, I think the old scheme of housekeeping work would be revolutionized before another generation of housekeepers has passed away.

However, we must not be content to view this subject merely from an indirect standpoint. I think the object of this convention is to discuss plans for the purpose of bringing men and women into personal touch with institute work. Hence we must consider how we can induce the girls to join and take part in the meetings.

Miss Smith is to explain the plan of organization, and I had better leave that matter to her, simply saying that we have district officers for the riding, with local presidents and secretaries for the branches.

INSTITUTE WORK FOR GIRLS.

This point Miss Smith will make clear. We simply have the one set of district officers for the riding, and then as many branches as may be necessary to entirely cover the riding, so that if ladies can not travel ten or fifteen miles to a meeting a few can gather together in their own neighborhood, hold their meetings in their own homes or in a central place under the direction of local officers, and for this purpose we want the branch institutes. I would, if possible, appoint a young girl just out of school as secretary for the local branch. When young people take hold of any movement they are usually determined to see it succeed. This is true in regard to our women's institute work. A young girl taking charge of the work as secretary is naturally anxious and determined to see that the membership in her district at least shall keep up with that of the other branches, and, if possible, exceed them, and in order to keep up the membership she will induce her young girl friends to join. This is a benefit not only to themselves but to the organization.

Again, I think that in some sections at least it is well to have music, not too much, one or two musical selections at a meeting.

If on their first appearance at the meeting any of our girls were asked to prepare papers, they would probably refuse. But if you would say to a girl, "Would you be kind enough to help out the programme by giving one of your well-known musical selections?" she would probably feel at home at once. Moreover, she feels she is responsible in some measure for the success of the meeting; and, after she has listened to the discussion on different papers read. she is prompted probably to take some other part in the programme.

Another means of arousing interest is through the question drawer. I believe this is largely the life of our women's institutes. We try to induce each member to have a little notebook and pencil hanging over the kitchen table, to make notes of anything which may occur to her in the midst of her work. All through the month (the meetings are held once a month) she jots down any question that may suggest itself to her. After members have taken part in a few meetings, after they understand something of the workings of the institute, it is wonderful to see the number of questions that will occur to their minds; and, when they arise during the month, the young women jot them down, to be laid before the meeting at the end of the month.

If the presiding officer is acquainted with a young girl whom she knows to be capable of answering a certain question, it may be well to ask her to do so. Many times girls will speak on the spur of the moment upon a subject that interests them, who otherwise could not be induced to take part in the meeting at all. But once they have heard their own voices, heard themselves speak, they are generally ready and willing to take any part assigned them.

When this point is reached I think we should do our best to induce them to prepare papers, either by suggesting some special subject or allowing them to choose their own subjects.

I find that when we organize an institute in a riding or a branch the greatest difficulty is at the first meeting. In order to overcome this difficulty I like to arrange the date and the programme of the first meeting. As subjects I take articles on women's institute work and other articles prepared by delegates and old institute workers. These are helpful at the beginning. We are also indebted to the department at Washington for a number of bulletins sent out from that Department. I do not know whether the supply is limited, but I do my best to induce the secretaries to send for these, not for general distribution, but to be kept on hand. When a subject that sounds rather formidable is assigned to someone who has not made a study of it, and she is asked to prepare a paper upon it, she may at first be afraid to undertake it; but then we will find it well to say, "Here is this bulletin of the Agricultural Department; just read it over, and as you do so, see how far your own experience corresponds with it, and in writing your composition put in it, so far as possible, your own ideas." We find that in this way the members can prepare very good papers, and, of course, by assigning the subject to one member the information is imparted to all the other members. After a short time the members are able to select their own subjects.

The membership fee is twenty-five cents a year. This is used simply for local work, as the superintendent thinks that any woman who is not interested enough to pay twenty-five cents a year is hardly interested enough to read any literature that might be sent her. The handbook issued by the Department, as well as the annual report and similar literature, will be found to embrace a number of topics that will be sufficient to cover one or two years' work. So there is no difficulty in carrying on the work from the beginning.

In the new organization there are of course women who have never been in the habit of conducting meetings or appearing in public, and who are at first nervous; but on visiting them, say a year afterwards, I find that outside help is really unnecessary.

But, while these methods may all be very well at the beginning, to excite interest, to induce the girls to take part in the work, should not the ultimate aim of our women's institutes be to develop in our women more originality of thought? In our different meetings in Ontario we have had under consideration the subject of foods, their relations to the body; the chemistry of food, cooking and serving and judging. We have found much useful matter in the report of the meeting of this association held at Washington last year. The same line of work has been observed in the different States of the Union.

But, while we all recognize and admit that the subject of foods, their relations to the body, their chemistry and preparation and serving, is one of the most important topics that can be taken up, because it so largely affects the comfort, the health, the happiness of the members of the home, yet, in view of the extent to which that subject has been developed, is it not now time to pay some attention at least to the higher culture and refinement of the home? This may be done in a great many ways. I have not time tonight to mention more than two.

HOME PROBLEMS.

I should like to speak, first, of home decoration. If the members of this association could go with me into many of the homes that I have visited in the rural districts of the province, I think they would agree with me that there is some necessity for developing the tastes and culture of some of the housekeepers in our province. I would not like to say this if I did not feel that the same thing is true of every other rural district in America.

The other subject I would mention is that of dress or personal appearance. If we could develop in our young girls—the young members of our institute—the sense of what is right, fitting, suitable for different occasions, would it not go far to answer one of the questions on this programme, how we can bring most good to our girls through institute work?

But perhaps the real answer to the question is the solving of the servant girl problem, how to get help in the home, how to induce our girls who are badly needed in the home to stay there, rather than take a position at almost nothing in order to get away from the home. I think this can only be done by presenting every question in regard to house keeping in such a way that our girls will realize that housekeeping, home-making, need not be degrading and ignoble, but may be elevating, uplifting; that as new methods are introduced there need not be the monotony and drudgery usually associated with housekeeping; that, in short, housekeeping, home-making, is a study, a science, a profession.

WOMEN'S INSTITUTES.

Miss Rose: Having been identified with the women's institute from its earliest inception, and having closely watched its growth and noted carefully the beneficial results, it is with a degree of confidence that I speak of what it means to women.

PROGRESS IN HOUSEKEEPING.

The women who attend our institutes are the women who are our home-makers and keepers. On the knowledge they possess depends the future of our country. In the past little serious thought has been given to the housing, clothing and feeding of the *genus homo*. Sleeping in ill-ventilated rooms, clothed in garments not conducive to health or comfort, and fed on food prepared without the slightest regard to its nutritive value or digestive qualities could it be expected that the human race would or could advance morally or physically?

The special work of the women's institute is to open the eyes of the women to this fact. In any line of work ignorance is certain failure, accompanied by great loss; success lies in knowing how. When the women of our country realize how little they really know about the science of housekeeping, they will be glad to attend the meetings of the women's institute. How many women are ignorant of their own ignorance? These are the ones we want to get as members. By coming in contact with others of similar environments, aims and occupations, and hearing methods of work discussed, they almost unconsciously compare notes, and then begins the improvement. They get good and, getting good, can not fail to be helpful to others. What happiness comes into a woman's life when she feels her sphere of usefulness is no longer confined to the home circle, but is reaching out to those less favored than herself.

The institute is a wonderful developer of latent talents. I know the gentlemen before me will smile when I say that women are backward and slow of speech. When there is not a man present they appear afraid to express an opinion; but after being members of the institute for a little while this timidness disappears; then, in the words of Edward Everett Hale, it seems that "it is everybody's mission to ask questions, and then it is the mission of everyone to enjoy answering questions."

The institute becomes a very bureau of information where every phase of woman's work may be brought up and discussed. Many a woman, after attending the institute and finding out how great the field of learning is and what a small portion she has gleaned from it, reminds one of the old lady who, when she had climbed for the first time to the top of a big hill in her vicinity, exclaimed, "Gracious me! I had no idea the world was so big."

Women learn to look on housekeeping no longer as mere drudgery, but deem it a worthy life's work, demanding more skill and a wider knowledge than any of the handicrafts or professions, such as dressmaking, nursing, teaching, etc. They find that to fill properly the place of sister, wife or mother means at least a general knowledge of cooking, sewing, marketing, sanitation, the treatment of simple ailments, entertaining, and many other things.

Almost every woman excels in some special line; and it is with pleasure she imparts to her fellow-women through the medium of the institute not only her successes, but also her failures, which led up to her present proficiency. In this way in an afternoon the busy woman may gain, under pleasant conditions, a great deal more than much experience or many hours of reading might teach her.

SYMPATHY AND ENCOURAGEMENT.

I have left one of the most important features and missions of the women's institute to the last namely, its social element. Women on the farm, as a class, lead a busy, secluded, monotonous life. Their physical energies are more called into play than their mental faculties. This tends to bodily fatigue, often accompanied with discontent, when not relieved by having the mind occupied by pleasant thoughts and fresh interests. There is truth in the saying, "Imagination shortens the hours of labor and sweetens toil." The meeting together of the members of the institute enlarges the heart, broadens the sympathies and opens the eyes to see the good in others. The merry laugh drives away the headache, and one's own troubles dwindle into insignificance when listening to the deeper sorrows of another.

The heart, like the body, needs nourishment, and many a lonely woman by attending the institute finds there the kindly interest and sympathy she has yearned for and long felt the need of.

In education, in professions, in labor of every kind, nearly all work is now specialized. One teacher instructs in mathematics only; a doctor may treat but the ear or eye, or spend all his energy and time on operations. How does this bear on institute work? To a greater degree than perhaps we think.

When outside help is wanted for a meeting, does not the request come for some specialist—one who has trained as a nurse or graduated as a teacher of domestic science? This bespeaks progress. It shows that the women of our country are seeking not only the best, but the latest methods and knowledge. When a government not only furnishes schools for special training, but supervises such a system of instruction as the institute is proving itself to be, that country is a progressive one and can not fail to take its place among the foremost nations.

The question relating to women's institutes is no longer "To be or not to be." They are; and, if the present is the fullness of the past and the herald of the future, then is their continued success a certainty.

ORGANIZATION OF INSTITUTES.

Miss Smith: This is the age of organization, and women have their organizations as well as men. In many places the farmers' institute meetings are attended by both men and women; and it is well that they should be, because there is no field of industry where men and women have so many interests in common. But there are many times when subjects are discussed not interesting to one side of the house, while of the greatest interest to the other. We have got over this difficulty by having separate meetings in the afternoon, and a joint meeting at night, where general subjects are discussed, so that we keep the feeling of unity by having the evening meeting, and yet save time and have more satisfactory discussions by having the separate afternoon meetings.

The women have an organization of their own, with officers and all the machinery necessary. The women's institute is affiliated with the farmers' institute, and there is usually a spirit of the greatest mutual helpfulness between the societies.

OUTLINE OF SYSTEM.

(1) Each electoral division may have one institute, with a president, a vice president, a secretary-treasurer, and a number of directors, the directors being representative women from the different points in the division. These officers form the board of directors to transact the business of the society.

(2) Each district institute may have as many branch institutes as desired. There are always two or more directors chosen from the points where the branch organizations are, thus making a connecting link between the branch and the general society. These branch institutes have a local president and secretary-treasurer. The local secretary reports

everything to the general secretary of the district, and she alone reports to the superintendent, so that the superintendent corresponds with one general secretary in each electoral division. The greater number of women's institutes in Ontario hold monthly meetings conducted by their members. These branch institutes are the strongest and most useful point in our organization. In this way we reach the places where the institutes are most needed and do the most good.

FUNDS FOR THE WORK.

The Department of Agriculture gives each women's institute ten dollars a year, and each also receives ten dollars from either the farmers' institute or the county council, in some cases from both, thus giving it something to start with.

Another source of revenue is the yearly excursion to the agricultural college. Each farmers' institute has an excursion during the month of June. The women's institute receives some proportion of the funds provided, and they do all in their power to make it a success.

The funds obtained from the grants and the excursion are spent by the board of directors for work of the general society. Each member pays a membership fee of twenty-five cents a year. This is within the reach of everyone and gives all some interest in the institute. They belong to it. This money is spent where collected, for renting of halls, heating and lighting.

EXTENT OF MOVEMENT AND ELEMENTS OF SUCCESS.

That this system has worked well will, I think, be conclusively proved by the number of institutes we have and their large membership. There are in Ontario fifty-two women's institutes, aggregating a membership of over four thousand two hundred. At the same time we believe, with Tennyson, that "the old order changeth, giving place to the new, lest one good custom corrupt the world." We are ever in readiness to change, ready to remodel our system in accordance with the needs of the institute work.

This year we are trying a summer session for women, as many of them complain that the weather and roads are so bad in winter they do not get any benefit from the winter meetings. The meetings are to begin July 2d and last all the month. This is an experiment, but there is every indication of it being a success.

Another matter that has suggested itself to me is that we have an institute traveling library, consisting of books bearing on our work. This should be divided into sections, graded if you will, sending one section to any institute that may desire it for a given length of time. Many of our Ontario institutes are gradually getting a library of their own. By the plan suggested many books would be within the reach of members that they would never otherwise come in contact with.

Though this movement has had a marvelous growth, the work is no more all sunshine than anything else. We have our difficulties, the same difficulties the farmers' institute met with years ago. For one thing, there has been a misunderstanding of the work. The idea often exists among women that we wish them to do their work in an elaborate or fussy way. In fact, it is our object to simplify matters.

In the second place they often have a suspicion of our ability. They have done certain things all their lives, so, therefore, they must have done them right, which is poor logic.

The first thing to do is to win their confidence. If you can explain any difficulty they have experienced they will believe you do know what you are talking about.

We often hear it said that women look at everything from a personal side, that generally they do not think. While that is not an attitude of mind to be encouraged, we can often take advantage of it and win their confidence by appealing to their personal feelings. Often when we have held a meeting I have stood at the door and watched the people come in, and picked out those that I thought were antagonistic and gone and spoken to them. While they may not believe in "domestic science," or in dairy-school butter, yet, if you are interested in the baby, in the new dress, or in the piece of fancy work, you will get a respectful hearing, and that is something accomplished in the right direction. I am often greatly surprised at the cordial welcome we receive. It is the exception not to get a hearty welcome from the women of the district.

What benefits do we hope to reap from this movement? We hope to arrive at better and easier methods of work. This is a very important matter, because our domestic labor question is becoming one of the greatest problems of the age. When it is impossible to get "help" in our homes from the outside, the only solution is to make the work of the home as light as possible. Ruskin has told us "there can be no happy labor without thought." By learning as far as possible the reasons for our actions we become intelligent laborers, and it is only as such we become happy laborers. A thought behind the work removes the drudgery from it.

As mentioned in defining the "object" of the women's institute, its desire is to raise the general standard of the morals of our people. Man "does not live by bread alone," but he does live in his ideals, his aspirations. Man, as an uplifting, compelling force in the world, now holds his position by the ideas he has placed far above and beyond him, and for which he has valiantly striven.

While we wish to improve the material side of life, that is only, as it were, a means to an end—to elevate the ethical side of life. The one point on which all students of the past agree, all prophets of the future meet, all sciences from biology to ethics are enthusiastically at one, is in their faith in the imperishable power of the rightly-ordered home to so elevate life. Therefore it does behoove us not only as individuals, but as an organization, to study this subject and give others a chance to study it, in the women's institute or by any other methods that suit our conditions, so that our homes may take their place in the general march forward to a higher and truer civilization than we as a people have yet reached.

Mr. Dye: Mr. Chairman, I move that a vote of thanks be extended to these ladies who have, at great sacrifice of time and trouble, come here tonight to address us.

The motion of Mr. Dye was unanimously adopted by a rising vote.

HOW TO ENLIST THE INTEREST OF THE BOYS IN AGRICULTURE THROUGH THE HOME.

Hon. John Dryden, minister of agriculture of Ontario, was introduced by the president and spoke as follows:

Mr. President and Fellow-Workers: My chief, Hon. Mr. Ross, was, I believe, present with you last evening to welcome formally the institute workers to the capital city of our Province, but I think you will not be offended if I take the liberty of adding my own personal welcome. I reciprocate the terms of personal friendship with which your president has introduced me, for I value him as a personal friend.

In extending a cordial welcome to the institute workers from the United States who are co-operating with our own people in this association, I recognize that unitedly, in the United States and Canada, you are doing a very great work to uplift that calling which I especially represent, to which I have been attached all my life, and from which nothing could entirely separate me.

NEED OE ABLE MEN AS FARMERS.

Now, in agriculture we want our best and most brilliant young men, but we do not want any who are reluctant to ally themselves with this work. We want them to attach themselves to agriculture from choice. You will never find me undertaking to urge a young man to be a farmer unless I see that he has some personal qualifications to fit him for the business. If there is a lack of qualification he had better go into some other business that fits him better. But there are numbers of our young men who naturally belong with us. I believe that every man is born with some natural gift, and it is a good thing if the parent or guardian can discover early in the life of the child what his natural gifts are so that he may be educated in the direction suited to his natural capacity, to the end that he may be developed so that his future life will be of greatest satisfaction to himself and of greatest usefulness to his fellows.

A boy who is naturally enamored of ships, who is fond of the sea and all that, will very likely make an excellent sea captain or navigator; but I fancy he would make rather a poor farmer. My father always regretted that he had not been allowed when a boy to go to sea, a calling for which he had a natural fondness. He made a very good farmer, but probably he would have made a much better sea captain. A boy who shows early in life a passionate fondness for tools will very likely do best as a mechanic or a manufacturer. Then you will find another boy who from the beginning is fond of study, who likes to get down to the very bottom of things with which he comes in contact. He is fond of argument with his fellows, is fond of the excitement which controversy brings. Such a boy, we may expect, would become a very good lawyer, but not an extra good farmer. So, too, you will find sometimes a boy who shows a natural predilection for the study of medicine. But once in a while you will find a boy who is very fond of farm animals, who likes outdoor life and its occupations. Here you have the material for a good, practical, sensible farmer.

SENTIMENT AGAINST FARMING AS A CALLING.

But when you find this boy who has a natural liking for the farm, and when it appears that he has decided to make farming his life occupation; if this becomes known to the members of his family and his schoolmates, you will find them doing everything in their power to turn him aside from his natural inclination. Whatever may be the case in the United States (and I fancy that you are pretty much the same as ourselves), you will find at all events in Canada a sort of sentiment against this calling. I believe we have done a great deal in the last ten years in Canada to overcome this; I believe the day is fast coming when you will no longer hear this opposition to the life of the farmer as an occupation, but all along within recent years it has been the fact that, if a boy showed any natural talent, the cry is, "Oh, anything else would be better as an occupation than farming; why not fit him for a profession where he may shine?" Thus, if a boy has any natural inclination for becoming a farmer, you will find numbers who are ready and anxious to turn him against that occupation.

Now, across the sea in Great Britain there has not been such a sentiment. I have crossed the ocean seven times, I have mingled with persons from various parts of Great Britain, and I have discovered that their sentiment in this regard is very different from that we have here. From Queen Victoria down to her sons and grandsons, and through the best classes of English society, the greatest leaders in both political parties like to do honor to agriculture; they are not ashamed to be classed as farmers and to be called such. On the contrary, it has seemed to be an honor there to be a successful agriculturalist. Some of the best men of the community take pride in their farms, and their herds, and their flocks, and take pleasure in showing them to visitors.

But, as I have said, in this country there is this strong sentiment against farming as an occupation. The home influence must be very strong to settle permanently the conviction of the boy who inclines to make choice of this calling. But in point of fact the farmer is often the worst sinner in this respect.

I have not any very kindly feeling toward a farmer who talks against his own calling. But have you never met such? Have you never found the farmer talking, not only once, but repeatedly, and in the presence of his family, to this effect: "If I had my life to live over again I would not be a farmer. There are so many other occupations which are so much better."

Such statements repeated over and over again work upon the boy's mind, because he is at an age when he has not had experience and has not resolution enough to oppose the views of those who undertake to dissuade him from his choice.

A little later the boy goes to college, and there he hears over and over again the same arguments against adopting the calling of the farmer, and too often, instead of becoming as he might an excedingly good farmer, he is turned aside to become what I call a tired merchant or perhaps a starving lawyer. How miserable must be the life of a man who is imprisoned practically all day in his store, with longings again and again, stronger and more frequent as the man grows in years, for the old home. Such a man, if he ever gets rich enough, will go and buy the old homestead and live there. But such men seldom succeed, because they are out of their proper places. I say shame on the man who misrepresents the facts and turns aside from his proper pursuit the boy who has a natural inclination for becoming a successful farmer.

EARLY PREPARATION FOR FARMING AS A CALLING.

Now, how are you to treat a lad who has naturally an inclination for the work on the farm? In the first place, I would advise you not to provide him with a single cent of spending money unless he earns it. I want you to take in that idea, because it seems to me the prime thing necessary is to give the boy a personal interest in what is going on upon the farm. Train him for the life of the farmer when he is young; do not wait until he is twenty-one years old, for then you will not be able to do anything with him. Take him when he is quite young and let him understand that there is opportunity on the farm for him to earn something. This opportunity may come in various ways. For instance, on every farm there ought to be a few well-bred chickens. Somebody has got to pick up the eggs. Let the boy have that job, and let him have a percentage of the eggs as his own. In ways like this he can earn money for himself, to be put aside as his own and make with it his own little purchases. Or perhaps the cows are to be brought up regularly from the neighboring field. Make a bargain with him that he will get so much per day or week or month for attending to this. He will soon understand that this is his duty and he will never miss it, whatever the weather. Or it may be that somebody is required to go to the village for the daily mail. Let the boy understand that that is his job. So there are a hundred things you can think of that he can do.

Or, what is still better than occupying his time with these odd jobs, give him a plot of land as his own land (and most farmers have plenty of land to spare). Let him understand that anything he may grow upon this land shall belong to him, but do not give him this plot and say, "There, take that; do as you like with it." The little fellow will wonder probably what he ought to do with it. He will need somebody to come along and help him by teaching him what he is to do. The first time I ever went out with a team to run a plow I was given the worst plow on the place. I was not used to working horses. I did not know how to go about the work. I could do nothing with that team. I was almost broken-hearted. I sat down and cried like a baby. Afterwards

I got so I could handle a plow as well as anybody, and I could do it now if it was my work.

I say it is not right to treat a boy in that way. Give him a plot of land if you will, but enter into a partnership with him at the start. Give him some instruction as to what is best for him to do. Find out his inclinations; give him sympathy and help. If the boy has any natural aptitude for farming life you will bring it out.

That is the best kind of education you can give him. It will teach him method in his work; it will teach him to think his own way out, and, best of all, it will teach him to work for definite results; and that is what is wanted in any line of work, in any calling, and especially in connection with farm life.

I believe in work; a farmer must work reasonably and in due season, but I would not want my boy or your boy to become simply a drudge, a machine, going round and round so many hours a day, with barely time to himself to eat and sleep—an unceasing round of work, work, work, from Monday till Saturday and sometimes on Sunday. Boys so treated lose completely their interest in the farm. I say that is not the fair and right policy. Let the work of the boy on the farm have a meaning and a purpose. Let him understand that the work gives certain results which can not be accomplished in any other way, and give him a chance now and then to go outside and see what other people are doing. Let him see what good scientific agriculture is, and let him be encouraged to pursue proper methods.

One other thing: To interest the boy provide for him the very best reading matter that can be found, the best agricultural journals, and the best books. But that is not enough. I think that every father or mother ought to read with the boy, ought to go into partnership with him in this matter. Let him read to you. When you get your paper or your book, hand it to him and say, "I should like to hear you read this." And then you can have a little discussion upon what has been read.

The development of the boy's body and mind should go together, ought to be accomplished at the same time, and the boy ought to learn in this way that there is not only need of skill, but much thought properly directed. I believe a boy thus trained would grow up to be interested and enthusiastic in reference to agricultural pursuits.

SCHOOL TRAINING FOR THE FARMER.

Now, I will say nothing about your country, Mr. President, for I do not know your conditions, but I assume that they may be pretty nearly the same as ours. But I will say that in this country a boy is not likely to receive the education that he ought to have in a common school. He needs something beyond that. I want to say to anyone who happens to have a boy whom he is trying to guide in this direction, beware when you take a boy of that kind and send him to one of the high schools of this country. There is danger ahead, not because of anything wrong in the school or the teacher, but you will find that a great majority of the students of that school have selected other callings in life than that of the farmer; for that reason they have come away from the farm, and they are full of arguments against the farmer's life. And when they find a boy that intends to go back to the farm they begin to ply their arguments. Here is where the greatest danger comes. His schoolmates say to him that he is making a mistake in choosing the occupation of a farmer, and unless there is somebody at hand to give him the arguments against those that are urged upon him and to put him on his guard, there is danger of his being turned aside after all to find, perhaps, some occupation that he does not believe in and in which he will never make a success.

Now, I have no hesitation in telling you what I think ought to be done with the boy. Instead of sending him to a high school, let him spend, two, three, or four years at the agricultural school at Guelph. This school, unlike some others, is devoted entirely to agriculture. The effort there is to make prominent the practical side of agriculture in its various lines. There the boy does not incur the danger that I have spoken of. If you take a boy who has a natural inclination toward the farm, who really wants to be a farmer, and if you let him have three or four years at the agricultural college, I guarantee that he will come away not only retaining his inclination toward the farm, but enthusiastic along that line. I have seen how this thing operates over and over again. I do not know of any case in late years where a lad of the proper qualifications, sent thus to the agricultural college, has been turned aside from his chosen occupation. On the contrary, all the influences there are in the reverse direction; they are all toward agriculture as the best calling for a young man who is fit for it, whereas in the other colleges the influences are all in the opposite direction. At our agricultural college a youth has all necessary advantages in the way of general education, and along with them he receives an education in these other lines fitting him especially for the calling he has selected.

BREADTH OF MIND IN FARMING.

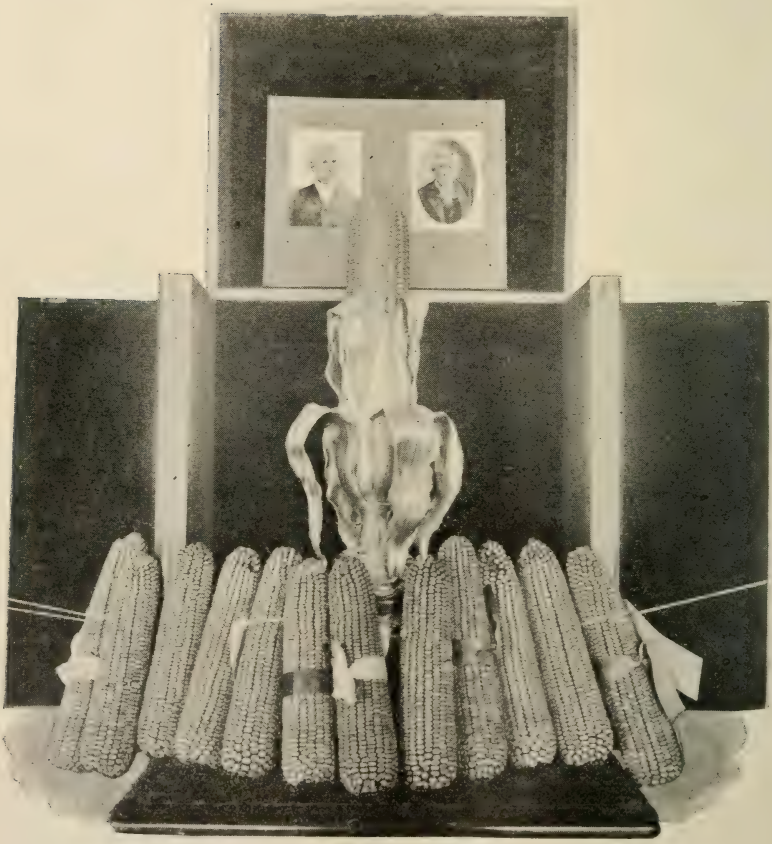
What we need, I believe, is young men of keen, perceptive minds, well trained for the calling of agriculture that they have chosen. We do not want men of but one idea. How often do we see men of considerable intelligence with but one idea—one line of thought to which everything else is made subordinate. I think, of all men on earth, the worst is what I call a "crank;" and the farmer who is a "crank" is about the worst man you can get hold of. We want young men with intellects well trained, so that they will be broad-minded, men of sound judgment, so that they will be sympathetic with their fellows, and, while energetic in their own business, will be public spirited. What we want in this country and what is wanted, I apprehend, in that other country from which many of you come, is that we shall bring ourselves together as one man. We ought to have the same step and go in the same direction.

But especially do we want young men with enthusiasm. After all, Mr. President, is not that the one indispensable quality? Show me a man with enthusiasm as a farmer, and I will show you a man who is sure to be a success; but without enthusiasm a man can scarcely be a success anywhere.

The foundation for all this is the influence of home. The old adage is, "Just as the twig is bent the tree's inclined." What we need is to keep the twig straight, and then you may expect a straight tree. But if the young man has any leaning at all in any direction, I would like him lean toward what I call the original, and, after all, the very noblest occupation known to man anywhere in any country—I mean agriculture.

A. E. Cook $1,500 Trophy.

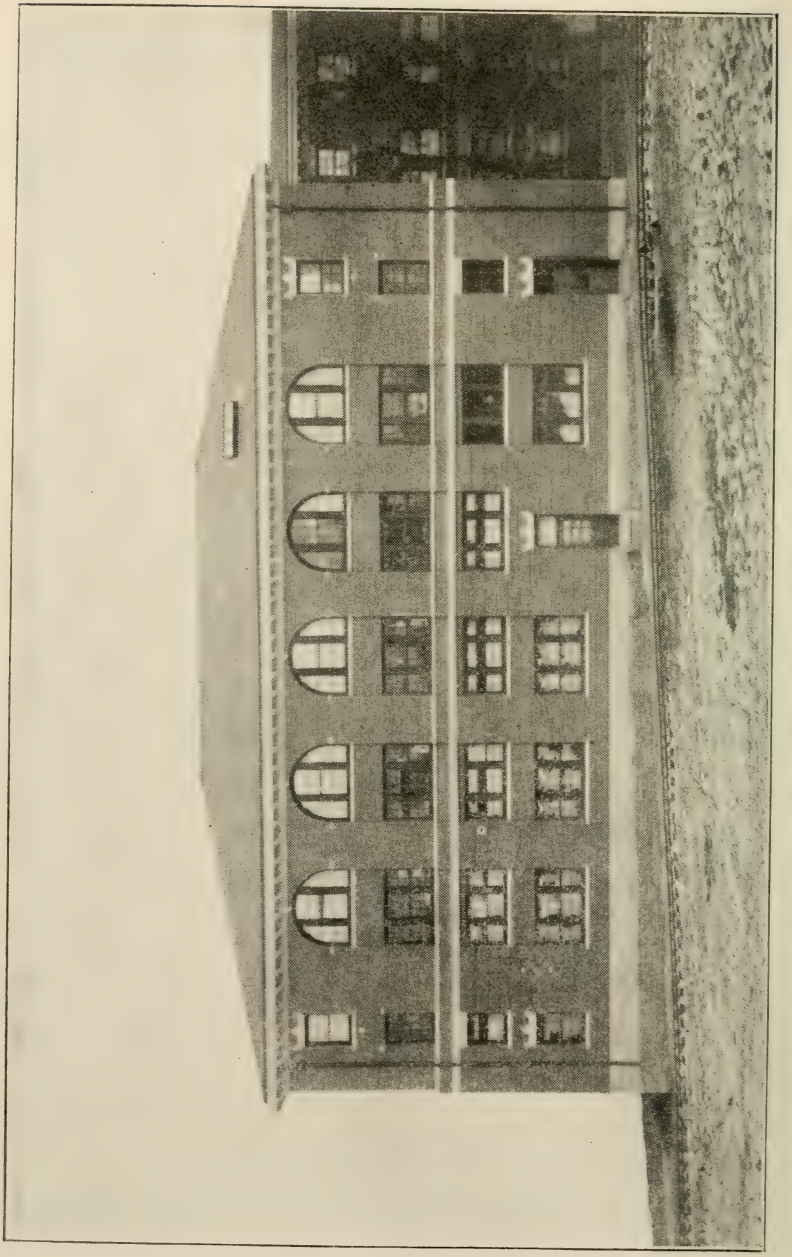
Won by D. L. Pascal, DeWitt, Iowa. Given for the best ear of corn exhibited at the Iowa State College, Ames, Iowa, January 4-16, 1904. A. E. Cook, Odebolt, Iowa, donor.



WHITING TROPHY.

Won by Asa Turner, Maxwell, Iowa. Hon. W. C. Whiting, chairman of the department of agriculture of the Iowa Louisiana Purchase Exposition Commission, donor. Given for the best ten ears of corn exhibited at the Live Stock and Corn Judging school at the Iowa State College, Ames, Iowa, January 4-16, 1904.

One of the Classes at work in the Corn School, Iowa State College, Ames, Iowa, January 4-16, 1904.



New Farm Mechanics building, Iowa State College, Ames, Iowa.

PART IX.

IOWA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS.

SECTIONS OF LAW GOVERNING COURSES OF STUDY, TUITION AND ADMISSION TO COLLEGE.

COURSES OF STUDY.

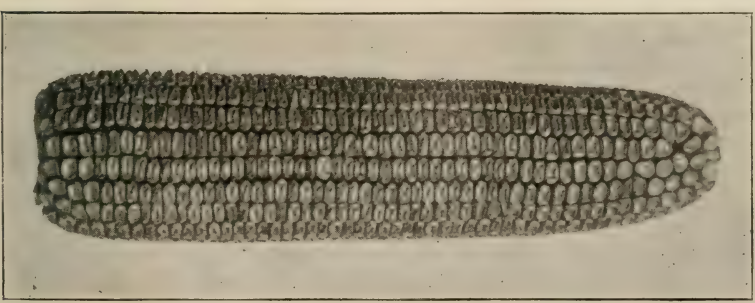
Sec. 2648. There shall be adopted and taught practical courses of study, embracing in their leading branches such as relate to agriculture and the mechanic arts, and such other branches as are best calculated to thoroughly educate the agricultural and industrial classes in the several pursuits and professions of life, including military tactics, and, as a separate department, a school of mines, in which a complete course in theoretical and practical mining in its different branches shall be taught.

TUITION—ADMISSION.

Sec. 2649. Tuition in the college herein established shall be forever free to pupils from the state over sixteen years of age, who have been residents of this state six months previous to their admission. Each county in this state shall have a prior right to tuition for three scholars from such county; the remainder, equal to the capacity of the college, shall be by the trustees distributed among the counties in proportion to the population, subject to the above rule. Transient scholars otherwise qualified, may at all times receive tuition.

THE FARMER'S SHORT COURSE IN SCHOOL IN LIVE STOCK AND CORN JUDGING AT THE IOWA STATE COLLEGE.

By Prof. W. H. Olin, Instructor in Farm Crops.



"An ear of corn that has been to college."

This short course school is held during the mid-winter vacation when the instructors of agriculture can devote their full time to the work, and the farmer finds it most convenient to get away from his farm and his work. This year it was planned to hold the school in the new octagonal fireproof judging pavilion just completed for this work.

Beginning classes were formed in both stock and grain judging. These classes met in the new pavilion while the advanced classes in stock judging met in the round pavilion, and the advanced classes in corn judging in the demonstration room of the new Farm Mechanics Hall. The number enrolled in the beginning classes taxed the capacity of the room provided, and if the enrollment increases next year as it has the past two years, Professor Holden and Professor Kennedy will be put to the test of finding a place to hold their classes.

This year the regular enrollment approached six hundred, while the attending visitors for a day to three days at a time numbered one hundred and fifty more. Nearly every county in the State was represented with from one to a dozen representatives from fifteen different states and Canada.

WORK IN CORN JUDGING.

In the advanced class, the study of standard varieties of corn raised in Iowa was taken up. First, a history of the variety, then the study of a typical sample, followed by scoring practice on samples of this variety, using a typical sample as a unit of comparison. Through the courtesy of manufacturing firms, many planters, representing both the rotary and edge drop system of planters, were used, through which white and yellow varieties were given the planter test. This enabled the class to judge the corn and follow it through the planter test.

In this class the principles of corn breeding, harvesting, storing and shipping seed corn were discussed. The lectures on corn breeding were given by Professor Holden and proved most interesting and helpful to the one hundred or more corn growing farmers who desired to learn the essential principles of breeding.

The block and individual row system of planting breeding blocks, the method of selecting, sorting, marking and recording seed ears was fully explained.

In the breeding classes, the individual ear was studied, then a group of ten ears, and next a test in the selection of the three best seed ears in order of rank was made. In the afternoon, both advanced and beginning classes met together in the pavilion, spending one of the two hours assigned to each division for class period, in general discussion upon some one of the many important topics related to the growing of field crops and especially corn.

President A. B. Storms, Prof. C. F. Curtiss, Prof. P. G. Holden, Dean Henry of Wisconsin, Editor Henry Wallace of Des Moines, Mr. E. C. Fursman, a veteran corn raiser of Illinois, and Iowa's corn decorator at St. Louis, Mr. S. C. Scofield, of the Department of Agriculture, Washington, D. C., Prof. W. M. Hays, of the University of Minnesota, Mr. L. S. Kerrick, Illinois' great Angus breeder, Mr. Joe Wing of the Breeders' Gazette, R. B. Swift of the International Harvesting Co., Mr. R. B. Wentworth of State Center, Hon. W. C. Whiting, and others, helped to make the afternoon conferences and the evening meetings times of great interest and enthusiasm. The value of the class study in corn was clearly given by Professor Holden in one of his closing talks to the corn school: "The one great object of corn judging is to learn to select that ear for our seed that will produce the greatest yield. It is a test of individual ears. Some ears will produce twenty to thirty bushels to the acre, while other ears, of the same variety and type of corn, given the same treatment, planted on the same soil, will produce as high as ninety and even one hundred and thirty bushels per acre. This is found everywhere.

"There is a great difference between the stalks of corn in the same hill as to producing capacity. When three kernels are placed in a hill we may find one large ear, one medium ear, and one inferior nubbin, little better than a cob. Take two ears for comparison. One may show a low producing capacity and all the brother and sister kernels scattered through a field give similar results—fifteen, twenty or thirty bushel capacity. Another ear having high producing capacity shows yields in all the brother and sister kernels through the field of fifty, sixty and eighty bushels per acre.

"This shows the tremendous advantage of being able to select the ears having seventy-five, eighty and ninety bushel capacity. The work of these two weeks, on these tables, has been put to the test in the last two seasons, by each one being called on to select the first, second and third best seed ears. I have been well pleased with the result.

"Pointed kernels—weak tips, small germs—give stalks with low producing power. There is a great difference in feeding value between different ears. Ears with kernels having large germs and full tips are richest in feeding value, for the germ is the richest part of the kernel and the tip is next to it in feeding value. It is also found that this kind of a kernel not only produces stronger plants, but gives a greater yield. For these reasons farmers of Iowa are finding study of corn yielding positive and practical results in increased harvest returns."

Mr. John Parkinson, of Bagley, Iowa, fifty-seven years old, said: "I am farming, and if there is anything to be gained by studying corn I want to know it. I am not too old to learn. I have never been to Ames before and I wanted to see what you are doing down here. I like it well. I think it a great thing for the State of Iowa to have such a school. We have been farming haphazard too long. Every one I have spoken to here says there is more in studying corn than he had any idea of. We farmers will get waked up after while."

EXAMINATION IN CORN JUDGING.

This examination was given at the close of the corn school. Each applicant for a corn judging certificate was asked to (a) score a sample of ten ears, scoring each ear, on each element in the score card; (b) write in full reasons for cuts made in above scoring; (c) select first, second and third best, and the poorest ear in five samples—fifty ears.

One hour was given for scoring and writing reasons for cuts (a and b), and ten minutes was allowed for each of the four selections called for in (c).

This examination was designed to test the student's accuracy of cuts on each element in the score card, ability to select the best ear in samples given as well as his ability to clearly state reasons for the work he had done. This examination was optional and all who made creditable grades were presented with a corn judging certificate by the Iowa Corn Growers' Association.

Nearly three hundred individuals took this test. One hundred and fifty dollars worth of premiums were offered for meritorious work in corn judging. The Farmers' Tribune gave a one hundred dollar trophy prize to the judging team of not less than three individuals that passed the best examination. Nine corn clubs and farmers' institute teams entered this contest, the Muscatine County Institute club winning the trophy. Mr. Fred Meinecke, of Forest City, Iowa, won the individual sweepstakes prize in corn judging—one hundred dollars in products of the American Corn Product Company.

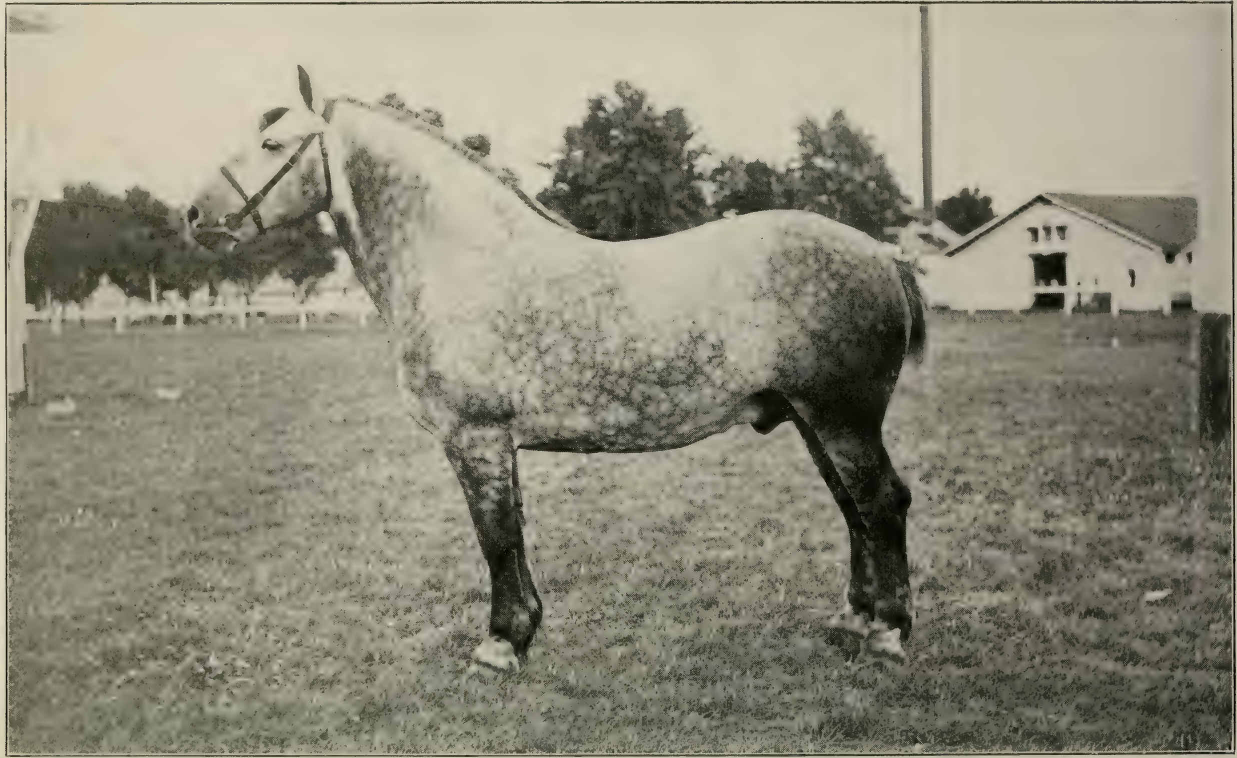
THE CORN EXHIBITS.

In connection with the corn school, the Iowa Corn Growers' Association, held a corn exhibit. They offered three thousand dollars in premiums, all prize winning corn to become the property of the Corn Growers' Association and to be entered by them in the State's exhibit at the Louisiana Purchase Exposition of 1904. All prizes that may be won by this corn at St. Louis to go to the original owner who entered the corn at the corn school.

For this exhibit, the State was divided into three sections; northern, central and southern; each section was divided into three districts, making nine districts for the State.

The entries were divided into individual and club exhibits; each of these into best single ear and best ten ear classes for each district. Each section had its sweepstakes prize, and each class of entries a grand sweepstakes prize for the State. Two features of this exhibit were quite noticeable. First, the good quality of the corn entered. (Mr. C. A. Rowe, of Jacksonville, Ill., who judged the exhibit, pronounced it the finest lot of corn he ever saw.) Second, the exhibit by clubs. The Monona County Institute club sent in an exhibit of ninety samples, while nineteen other corn and farmer institute clubs sent in very satisfactory exhibits. Every county in the State was represented in one or more of the classes of entries made. "The work in selecting this corn, the study of it at the corn school, the premiums earned, and especially the formation of the clubs for the study of corn, are going to result in much careful study and improvement of corn. These Hawkeye exhibitors mean business and our State must look wlel to her corn laurels if she gets to wear them much longer." Thus remarked an Illinois agricultural editor after inspecting the corn entered for premiums.

The grand trophy prize for the best ear of corn was awarded to Mr. D. L. Pascal, of DeWitt, who won with seventy-seven entries in his class.



"MEDOC."
Prize winning Percheron stallion as seen at the Iowa State Fair of 1903. Owned by L. W. Cochran, Crawfordsville, Ind

This was the A. E. Cook one thousand five hundred dollar trophy prize, a picture of which is given on another page.

The award for the best sample of ten ears entered went to Mr. Asa Turner, of Maxwell, Iowa. He won the four hundred and fifty dollar Whiting trophy, given by Mr. W. C. Whiting, of Whiting, Iowa. There were one hundred and sixteen entries in this class.

The Wallaces' Farmer two hundred and forty dollar trophy corn cup was the grand sweepstakes prize for best club exhibit of fifty ears. This was aarded to the Emerson Corn Club of Emerson, Iowa.

The corn exhibit feature of the corn school deserves encouragement, and it is to be hoped that the Corn Growers' Association will receive such hearty support in this matter that they can afford to make this feature a permanent one. The premium feature was inaugurated two years ago by the Iowa Homestead giving one hundred dollars in cash premiums for a corn show. This gift they repeated this year. The Grain Dealers' Association of Iowa contributed several hundred dollars to the premium list, and individuals throughout the State have given from five to fifty dollars "to the good of the order," and deserve the appreciation and gratitude of the corn growers of the State.

LIVE STOCK JUDGING.

The work in the four classes of live stock, sheep, horses, cattle and hogs, was taken up in the order named, three days being given to the study of each. In the advanced classes the selection of good breeding stock and the questions pertaining thereto, were taken up, while in the beginning classes the unit types of each class of animals were studied with vigorous score card practice. The college has some very good specimens of all classes of stock studied, but Professors Curtiss, Kennedy and Rutherford resolved to supplement these by the very best obtainable.

Through the courtesy of Dunham, Fletcher & Co., of Wayne, Ill., the classes in live stock were given a chance to study some international prize winning Percheron draft horses and roadsters. A handsome coal black Percheron—"Pink"—who has made the sweepstakes champion in his class for America at the International in 1903, gave an almost ideal object lesson in scoring. The study of horses showed that the type of draft horses that commands the highest price today is a deep-bodied, broad, close-coupled massive horse, with deep strong loin and hind quarters; he should be deep and wide in the chest to insure a rugged constitution; legs well set, with clean compact bone, sloping pasterns; feet large, round, wide at the heels, and of fair depth; weight one thousand six hundred pounds or over.

Every farmer should attempt to produce horses of some definite type, such as the market demands. The greatest need in horse breeding today is some definite plan of breeding. Draft horses are the horses for the average farmer to raise.

While studying beef cattle, Prof. W. A. McHenry loaned the college some excellent sires, dams and yearlings from his fine herd of prize winning Angus. Good representative animals in other breeds helped to fix breed characteristics and definitely bring out beef type and dairy type.

To permit further study of these types and also to show how beef carcasses dress and cut up, a carcass demonstration was given to the stock judging classes. The animals chosen for this work were eight college steers that for the past year had been in a "beef vs. dairy type" experiment. The dairy type was represented by two Jersey and two Holstein steers, the beef type by two Hereford and two Angus steers.

Monday, January 11th, Mr. John Gosling, of Kansas City, Mo., an expert judge of beef both on foot and on the hooks, judged the eight animals to be in the slaughter test. He placed the Angus first and fourth; Hereford second and third; Holsteins fifth and seventh; Jerseys sixth and eighth. Hero, a white Shorthorn international prize winner, was slaughtered with the other steers to show the carcass composition of an overripe steer. The carcasses were bought by the Agar Packing Company of Des Moines at the following prices per hundred, live weight: The Jerseys, $3.65; Holsteins, $3.85; Angus, $4.75; Herefords, $5.00; Shorthorns, $5.75.

The animals were slaughtered on the 12th and the carcass demonstration was given in the class room Thursday the 14th. So great was the interest—not half those desirous of seeing the carcasses and hearing the lecture being able to get into the judging room—that the forenoon lecture was repeated in the afternoon. This was certainly one of the greatest dressed beef demonstrations "Uncle John" has ever given, an all day lecture on beef.

Mr. Louis Young, one of the head cutters of a leading retail meat shop of Chicago, cut up one side of each of the nine carcasses under Mr. Gosling's direction. The other half of each carcass was hung in the class room, each one clearly labeled, so the full half of each beef could be studied during the progress of the lecture.

The carcasses, when judged, showed the same placing the live animals had received.

Mr. Young made the loin and rib cuts of the nine animals, which were placed on trays on a table and became the subject of a very instructive lecture, wherein the desirable and undesirable points of each were clearly pointed out. Mr. Gosling gave the students a unit standard to judge from, by exhibiting a rib cut of a yearling Hereford steer, the choicest specimen of beef he could find in Kansas City. It had a marbled appearance with the fat evenly distributed throughout the lean, giving tenderness and flavor to the roast.

Mr. Gosling showed the difference in meat composition in the beef and dairy types, and also between the breeds in each type; with charts he illustrated the seven block cuts, and then had each cut shown for each animal studied; explained how character of bone and flesh indicated age; explained how age of cattle are told by their teeth, illustrating with teeth of animals slaughtered. He showed what porterhouse, sirloin and other cuts are, and where located on the animal; what the "eye" of the beef is, and showed the fat vein in the meat.

The demonstration was a complete success, and the information given was of such value that a bulletin will be issued by the Animal Husbandry Department covering this work.

The last three days of the course was devoted to the study of hogs, the college furnishing good specimens of the numerous breeds. This being the greatest hog State in the Union it is highly important that we carefully study both breed and market types so we can keep our State at the forefront in this class of farm products.

Two of the most interested students in both corn and live stock work were ladies—Miss Genevieve Milnes, senior student in the college, and Miss Alice Mann, of Irvington, Iowa. Miss Mann, with her brother, owns and runs a 200-acre farm. She is a college graduate, has been a most sucessful teacher and is now a prosperous farmer. In speaking of the work given at this short course school, she said:

"The short course is a great thing for Iowa farmers, and more women should attend. There will be more another year. We are going tc do missionary work, and when the ice is once broken the women will come. There are many features that will prove of the greatest practical value to farmers' wives. Every farmer of Iowa should be here and he cannot afford to leave his wife at home.

"The corn work especially is an enjoyable study to me. My brother and I run a farm of two hundred acres. We raise a small herd of good cattle, and after this course I will be better able to take charge of the cattle work. I expect to specialize, however, in breeding corn. I expect to select some type that is suited to our soils and climate and to breed this corn exclusively. I expect to do what I can as fast as I learn to produce seed corn of a pure breed. I will be back next year, and I expect a good many more women here next year."

In answer to the question, "Are we laying too much stress upon this matter of corn judging?" a short extract is given from an address to the short course students by Prof. C. F. Curtiss:

"Someone asked a great artist what the essential thing to success was, and he replied, 'seeing right,' i. e., you must have an eye and a conception of what is right before you can succeed. This is equally true in agricultural work, you must have a high standard of what is right before you can do right.

"In judging corn the first thing is to be able to 'see right,' to see the defects, the good points, etc. This is the reason why so much stress has been placed upon the judging of corn and stock. If we were simply making judges, as judges, we might be open to criticism. No man can be a successful breeder of corn or of stock, a good corn producer or a producer of any high class products without he be a good judge of them.

"A man must first know what the product is before he can produce the best product. The judging of the corn and stock, which we are laying so much stress upon, lies at the foundation of all the improvement in agricultural work."

May this short course work continue to prove a helpful factor in advancing agricultural interests, researches and prosperity in Iowa.

THE DEPARTMENT OF FARM MECHANICS AT THE IOWA STATE COLLEGE.

C. J. Zintheo, Professor Farm Mechanics Department, I. S. C.

The State of Iowa may well be proud of its agricultural college. The Ames College of Agriculture is better and more favorably known than any college of its kind in this country. All other colleges of a similar kind look to this institution for innovations along new lines of investigation and teaching. In Animal Husbandry, the college is far in the lead of all others as demonstrated by the fact that for the third successive time it has won the Spoor Trophy at the International Live Stock Show in competition with all comers. The Dairy School has a splendid reputation.

In the matter of improving and developing corn, the Division of Agronomy is now doing more for the farmers of Iowa to increase their wealth than any other agency among them.

As a fitting climax the college has made an entirely new innovation in establishing a department of Farm Mechanics. With its usual characteristics, the college is not doing anything by halves, but it has gone into this new work with a vim and enthusiasm which promises to outstrip all previous efforts.

Such a department is eminently appropriate in the Agricultural College when one considers that the State of Iowa has $57,960,000 invested in farm implements, and that the sum so invested amounts to about one dollar and seventy cents for every acre of land in the State.

That there is an enormous waste of money due to the neglect and unskillful handling of this part of the farm equipment, must be obvious to anyone who has traveled through the State. It is to overcome this waste and to teach the agricultural students how to care for and properly operate the machinery on the farm that this department of Farm Mechanics was established.

For the department has been erected a modern fireproof building 60 by 100 feet, four stories high. There are already one hundred and twenty-five students enrolled in Farm Mechanics and also several post graduate students who are preparing themselves to teach the subject in other institutions. Among the subjects taught in the course are the following: Field Engineering, consisting of laying out farms, mapping and plotting of fields for crop rotation, location of farm buildings, fence construction, water supplies, tile and surface drainage, road construction and irrigation; Rural Architecture, consisting in planning of farm buildings, such as barns, living houses, machine sheds, granaries, etc., arrangement of stalls, testing of different materials used in farm buildings. The students make complete drawings and specifications of the buildings, and figure out the cost according to the market price of the materials.

In the laboratories the students have practice in drawing, carpentry, blacksmith work, and horseshoeing. They are also taught how to do the repair work on the farm, and to make neckyokes, whiffle-trees, and other articles in the carpenter shop which they have to "iron" in the forge shop.

The course in farm machinery consists in studying the history of the development of the various farm implements and the principals of their construction. The various implements are brought into the operating room, where they are taken to pieces and then assembled by the students. Special emphasis is made in their proper adjustment for the best work.

Binders, mowers, corn harvesters, plows, wagons, corn huskers and shredders, corn planters and cultivators, drills and seeders, all receive careful study by the individual students.

The course in farm motors consists in a study in the construction and operation of traction engines, gasoline engines, windmills, and other forms of farm motors.

Besides these required courses for all agricultural students, the department offers elective courses in farm implement design and construction; also research work and investigations in the strength of building materials, rural telephones, traction tests, silo construction, arrangement of farm water supplies. irrigation machinery, etc. Courses are also offered for post graduate work along most any line of agricultural engineering in which the student is interested and for which he is fitted by previous training.

While the course was only started last fall, the work is already well in hand, and students are enrolled from numerous States in the Union, and some have come from Mexico and South America to take up this work.

PART X.

LAWS RELATING TO FARMING AND STOCK RAISING INDUSTRIES IN IOWA.

MEANING OF TERMS.

Sec. 2311. As used in this chapter, the term "owner," used with reference to animals, means any one entitled to the present possession thereof, the one having care or charge of them, and the person holding the legal title to them, and as to land the person having title hereto, or the lessee or occupant thereof; the term "stock" means cattle, horses, mules and asses; the term "animals" means all animals which may be distrained under this chapter; and "trespassing stock or animals" means those unlawfully upon land, or running at large contrary to law or police regulations.

COMPENSATION UNDER THIS CHAPTER.

Sec. 2349. The compensation for services under this chapter shall be as follows:

1. For distraining stock, fifty cents for each head not exceeding two, and twenty-five cents for each additional head taken on one distraint;

2. For distraining each stallion, jack or bull, one dollar; for distraining each boar or buck, fifty cents;

3. For distraining any other animals, twenty-five cents each, not exceeding four, and ten cents for each additional head;

4. For keeping male stock named in section twenty-three hundred and twelve of this chapter, fifty cents a day, and all other stock twenty-five cents a day, from the time the same is taken up;

5. For keeping any other animals, ten cents a day from the time the same is taken up;

6. For posting notices and selling male animals, the same fees as are allowed constables for like services upon execution;

7. For taking up as an estray one head of stock, fifty cents, and twenty-five cents for each additional head at one time;

8. For taking up any other kind of estray animals, fifteen cents each;

9. To the justice of the peace, for all services in each case of taking up estrays, fifty cents;

10. To the county auditor, for all services in each case of estrays, including posting and publishing notice, but not including the fee of the printer, fifty cents;

11. To the township trustees, for posting notices, twenty-five cents, and services not otherwise provided for, the same fees as are allowed in assessing damages done by trespassing animals, with five cent mileage each way.

12. To the township clerk, ten cents per each hundred words entered of record, the same fees for a copy thereof, and in addition twenty-five cents for his certificate thereto, and fifty cents for filing and approving an appeal bond.

MALE ANIMALS RUNNING AT LARGE.

Sec. 2312. The owner of any stallion, jack, bull, boar or buck shall restrain the same, and any person may take possession of any such animal running at large in the county in which such person resides, or in which he occupies or uses real estate, and give notice thereof to any constable in the county where taken, who shall sell the animal so taken at public auction to the higest bidder for cash, having given ten days' notice of the time and place of sale, describing the property, by posting the same in three public places in the township wherein such animal was found at large. Out of the proceeds of sale he shall pay all costs and any damage done by said animal, to be investigated and determined by him, and pay the remainder into the county treasury for the use of the county. If legal proof be made to the county auditor by the owner of said animal of his right thereto at any time within twelve months from the sale, he shall order the proper amount to be paid to the owner out of any money in the treasury not otherwise appropriated. If the owner, or any person for him, shall, on or before the day of sale, pay the costs thus far made, and all damages, to be determined by the constable if the parties cannot agree, and make satisfactory proof of his ownership, the constable shall release the animal to him.

DISTRAINT DAMAGE FEASANT—RECOVERY.

Sec. 2313. Any animal trespassing upon land fenced as provided by law may be distrained by the owner of such land, and held for all damages done thereon by it, unless it escaped from adjoining land in consequence of the neglect of such land owner to maintain his part of a lawful partition fence. The owner of the land from which such animal escaped shall also be liable for such damages if it escaped therefrom in consequence of his neglect to maintain his part of a lawful partition fence, or if the trespassing animal was not lawfully upon his land, and he had knowledge thereof. If there be no lawful partition fence, and the line thereof has not been assigned either by the fence viewers or by agreement of the parties, any animal trespassing across such partition line shall not be restrained, nor shall there be any liability therefor.

WHAT ANIMALS NOT PERMITTED TO RUN AT LARGE.

Sec. 2314. Swine, sheep and goats at all times, and during the time and as required by a police regulation adopted according to law, stock shall be restrained from running at large. Animals thus prohibited from running at large, when trespassing on land, or a road adjoining thereto, may be distrained by the owner of such land, and held for damages done by them, and for the costs provided in this chapter; but stock shall not be considered as running at large so long as it is upon unimproved lands and under the immediate care and efficient control of the owner, or upon the public roads for travel or driving thereon under like care and control. But where a partition fence is required by law to be erected or maintained, stock escaping across such partition line shall be dealt with as provided in the preceding section.

RECOVERY OF DAMAGES.

Sec. 2315. Instead of distraining trespassing stock or animals, the injured person may recover all damages caused thereby in an action against the owner thereof, and may join therein the owner of the land from which it escaped, if he is liable therefor. If distrained stock or animals escape or are released without the consent of the distraining party, he may recover his damages as above provided, with costs, and the costs of destraint made prior to such escape or release.

APPORTIONMENT OF DAMAGES.

Sec. 2316. If there is more than one owner of distrained stock or animals, each may pay his ratable share of the damages and costs, and release his animals. If the injured party elects to sue therefor, he may join in one action all or any of such owners who have not paid their proportion of the damages and costs.

ASSESSMENT OF DAMAGES—SALE.

Sec. 2317. Within twenty-four hours after an animal has been distrained, Sunday not included, the person distraining or his agent, shall notify the owner of the animal thereof, and, if he fails to satisfy the damages and costs, such person shall within twenty-four hours after such notice to the owner, verbally or in writing, request the township trustees to appear upon the premises to view and assess the damages. When two or more trustees have met, one of them having previously informed the owner of the animal of the time and place of meeting, they shall assess the damages and costs. If the owner of the distrained animal refuses or neglects for two days thereafter the pay the amount thus assessed, one of said trustees shall put up in three conspicuous places in the township notices, describing the property, and naming a time and place of sale, which place shall be where the property is distrained, and time not less than five nor more than ten days thereafter, that said property will be sold between the hours of one and three o'clock in the afternoon. At the time and place of sale, one of the said trustees shall offer for sale and sell the property at public outcry to the highest bidder for cash, but no sale shall be made after having realized a sufficient sum with which to pay the damages and costs, any remaining animals unsold to be at once returned to the owner, and also the surplus remaining, if any, out of any sold. If for any reason a trustee can not sit, the remaining trustees may appoint any disinterested citizen having the qualifications of a juror to act in his place.

ASSESSMENT MADE—APPEAL.

Sec. 2318. The trustees shall make their assessment in writing, and file the same with the township clerk, which shall be recorded by him. Any person aggrieved by the action of the trustees may appeal to the district court of the county. The appeal bond, conditioned to pay all costs and damages, shall be filed with and the sureties approved by the township clerk, in a penalty double the value of the property distrained, or, if the value of the property exceeds the amount of damages claimed, then double the amount of the damages and costs. Notice of such appeal shall be given within five days, and in the same manner as in appeals from a judgment of a justice of the peace. The appellant shall file an appeal bond within three days, Sunday not included, from the filing of the finding of the trustees, and, when an appeal is thus taken by the claimant, the distrained stock or animals shall be held for the satisfaction of such judgment as may be rendered on appeal, but the owner of said stock or animals may release the same at any time, before judgment, by filing with the township clerk before the appeal is certified, or with the clerk of the district court thereafter, a bond with sufficient sureties to be approved by the clerk with whom filed, conditioned to pay all damages and costs recovered in said cause on appeal. The clerk receiving such bond shall file the same, and forthwith certify the fact to the person having charge of the distrained stock or animals, who shall thereupon release the same to the owner. Where the owner appeals and files a bond, as herein provided, it shall operate as a supercedeas, and the distrained stock or animals shall be released to him. Within five days after the taking of the appeal, the township clerk shall make out a certified transcript of the record of the finding of the trustees, and file the same, together with the notice of appeal, if in writing, and the bond with the clerk of the district court.

ESCAPE OR RELEASE—RECAPTURE.

Sec. 2319. If any distrained animal escape or is unlawfully released, the injured person may recapture the same and proceedings under this chapter shall continue until the assessment of damages is made, which shall be conclusive, unless appealed from. Notice of the sale of such animal shall be given by the trustees as soon as possession thereof is regained by the distrainer, and the property sold accordingly, unless he regains such possession before the day of sale originally fixed, in which event the property shall be sold under the first notice.

PUNISHMENT FOR UNLAWFUL RELEASE.

Sec. 2320. If any one, without leave of the person having any animal under distraint, release the same, he shall be guilty of a misdemeanor.

ESTRAYS.

Sec. 2321. Any animal of an unknown owner running at large or trespassing within a lawful enclosure is an estray, and may be taken up by any householder in the county, except an unbroken animal between the first day of May and the first day of November, where such unbroken animal is not required to be restrained by a police regulation.

TAKING UP.

Sec. 2322. If any animal, liable to be taken up as an estray, comes upon any householder's premises, any person may notify him of the fact, and, if he fail to take up such estray for more than five days thereafter, any other householder in the same township may take it up and proceed with it as if taken upon his own premises, if he shall produce proof to a justice of the peace of the service of such notice. All persons taking up stray animals shall state under oath before said justice where the same were taken up.

NOTICES POSTED.

Sec. 2323. Any person taking up an estray shall within five days thereafter post up a written notice in three of the most public places in the township, which notice shall contain a full description of said animal, and a statement as to where the same was taken up. Unlesss such estray shall have been previously claimd by the owner, the person taking it up shall within ten days go before a justice of the peace in the township in which the estray was taken up, or, in case there is no justice in the township, then before the next nearest justice in the county, and make oath to the correctness of said notice, together with a statement attached thereto as to whether the marks or brands of said animal have been altered to his knowledge, either before or after the same was taken up, which notice shall be recorded by the justice in his estray book and within five days forwarded by him to the county auditor, who shall enter the same in the estray book in his office, and shall cause a copy of said notice to be posted at the court house door.

PUBLICATION.

Sec. 2324. If the estray is stock, the auditor shall cause the notice to be published once each week for three weeks in some newspaper in the county.

FEES AND EXPENSES.

Sec. 2325. The person taking up an estray shall pay the fee of the justice for administering the oath, recording the notice in his estray book, and forwarding the notice to the auditor, and shall also pay the justice, to be transmitted to the auditor, the fee of the auditor for entering the notice in his estray book, and for posting a copy of the notice, and also, if the estray is stock, the sum of one dollar and fifty cents to cover the expense of publishing the notice, which amount so paid in advance for fee and expenses, together with the compensation allowed by law, shall be refunded to the person taking up such estray by the owner of it, in case restitution is made to him. If two or more estrays are taken up at the same time by the same person, they shall be included in one notice and but one fee shall be paid therefor, and if only a part of the stock thus included is restored to the owner, a proportionate amount of such fees and expenses shall be refunded.

PROPERTY VESTS WHEN.

Sec. 2326. If the estray be stock, and be not claimed by the owner within one year, or, being any other domestic animal, be not claimed by the owner within six months from the time it is taken up, the property therein shall vest in the taker-up, if he has complied with the provisions of this chapter.

RECOVERY BY OWNER.

Sec. 2327. At any time before the property in the estray vests in the person who has taken it up, the owner shall be entitled to recover possession of it on paying to the person who has taken it up the compensation to which he is entitled by law, and the fees and expenses which he has paid out in advance, together with any reward which has been offered by the owner, and a reasonale allowance for the expenses of keeping such estray, taking into account the use which such person taking up has had of it, which allowance shall be made by the justice of the peace before whom a proceeding to recover the animal shall be brought in the event the owner and the taker-up can not agree with reference thereto.

VALUE RECOVERED.

Sec. 2328. At any time within six months after the property in an estray has vested in the taker-up, the owner shall be entitled on demand to be paid by the said taker-up the value of the estray, not including any increased value which has accrued since it was taken up, after deducting therefrom the compensation, reward, fees and expenses referred to in the preceding section; or the taker-up may, at his option, elect to surrender the estray, if still in his possession, in which case the owner must pay such compensation, reward, fees and expenses.

USE OR APPROPRIATION.

Sec. 2329. Any person legally taking up an estray may use or work it, if he does so with care or moderation, and does not abuse or injure it. But if any person unlawfully take up any estray, or take up an estray and fail to comply with any of the provisions of this chapter, or use or work it in any manner contrary to this chapter, or work it before having it appraised, or keep it out of the county for more than five days at any one time before he acquires a title to it, he shall forfeit to the county twenty dollars, to be sued for by any person in the county; and the owner of the estray may also recover of such offender double the amount of the injury sustained, with costs. Estrays adapted thereto may be bred and milked by the taker-up.

FINDER NOT LIABLE.

Sec. 2330. If any estray, legally taken up, escape from the finder or die without any fault on his part, he shall not be liable for the loss.

PENALTY AGAINST FINDER.

Sec. 2331. If any person shall sell, trade or take out of the State any estray before the legal title shall have vested in him, he shall forfeit to the owner double its value, and shall also be guilty of a misdemeanor. But the auditor may authorize the taker-up to transfer the estray to another, who shall take the place of his predecessor.

PENALTY AGAINST OFFICER.

Sec. 2332. If any printer, auditor or justice of the peace fail to perform the duties enjoined upon him in this chapter in relation to estrays, he shall frofeit to the county not less than five nor more than fifty dollars, to be sued for by any person in the county.

BOND TO RELEASE.

Sec. 2333. Before any property held under this chapter vests in the taker-up it may be released at once upon the owner giving to the holder a bond to be approved by the justice of the peace before whom the proceedings concerning the property have been had, conditioned to pay to the holder of the property, within twenty days after such approval, all costs and damages to which he is entitled on account of his action and loss in the matter.

MARKS AND BRANDS.

Sec. 2334. The board of supervisors of each county shall procure, at the expense of the county, a book for each civil township, to be in the custody of the township clerk, in which to record the marks and brands of horses, sheep, hogs and other animals.

RECORD.

Sec. 2335. Any person wishing to mark or brand his domestic animals with any distinguishing mark may adopt his own mark, and have a description thereof recorded by the clerk of the township in which the owner lives, for which such clerk shall receive a fee of twenty-five cents.

MARK PREVIOUSLY RECORDED.

Sec. 2336. No person shall adopt a mark or brand previously recorded to another person residing in the same township, nor shall the clerk record the same one to two persons, unless on their joint application.

ABANDONED ANIMALS.

Sec. 2337. Any person may take charge of any animal whose owner has abandoned it, or fails to properly take care and provide for it, and may furnish the same with proper shelter, nourishment and care at the owner's expense, and shall have a lien on such animal for the same, which, at the expiration of three months shall become a perfect title to the property.

FOOD AND WATER SUPPLIES.

Sec. 2338. In case any animal impounded or otherwise confined shall be without necessary food or water for more than twelve successive hours, it shall be lawful for any person, as often as necessary, to enter the pound, inclosure or building, and supply it with necessary food and water so long as it shall remain so confined, and the reasonable cost of the same may be collected by him of the owner of the animal.

BOUNTIES.

Sec. 2348. A bounty of five dollars shall be allowed on the skin of an adult wolf, two dollars on that of a cub wolf, and one dollar on that of a lynx or a wild cat, to be paid out of the treasury of the county in which the animal was taken, upon the certified statement of the facts, together with such other evidence as the board of supervisors may demand showing the claimant to be entitled thereto. The person claiming the bounty shall produce such statement, together with the whole skin of the animal, to the auditor of the county wherein such wolf, lynx or wild cat was taken and killed, and he shall destroy or deface the same so as to prevent their use to obtain for the second time the bounty herein provided. Any person who shall demand a bounty on any of the above mentioned animals killed or taken in another State or county, or on a domesticated animal, shall be fined not more than one hundred nor less than fifty dollars.

DOGS KILLED.

Sec. 2310. It shall be lawful for any person to kill any dog caught in the act of worrying, maiming or killing any sheep or lamb, or other domestic animal, or any dog attacking or attempting to bite any person, and the owner shall be liable to the party injured for all damages done by his dog, except when the party is doing an unlawful act. The provisions of this section shall not apply to any damage done by a dog affected with hydrophobia.

PEDIGREES.

REGISTRATION OF PEDIGREES.

Sec. 2341. Any owner or keeper of a stallion or bull for public service who represents him to be pure bred, thoroughbred, or standard bred, of any breed of horses or cattle that has a stud or herd book for the registration of pedigrees, shall place a copy of a certificate of registration on the door or the stall or stable where such animal is usually kept, giving the registration number, name of breeder, name of animal, and the volume and page of the stud or herd book, in which such animal is recorded, and, when requested to do so, shall give to any patron a copy of such certificate. Any violation of the provisions of this section shall be a misdemeanor.

PUBLISHING FALSE PEDIGREES.

Sec. 2342. Any person who shall post or publish or cause to be posted or published, or shall cause to be recorded in any public record kept as a record of pedigrees, any false pedigree of any horse, cattle, sheep or swine shall be guilty of a misdemeanor, and punished by a fine of not less than fifty dollars and costs, and be imprisoned in the county jail till said fine is paid, but not exceeding three months.

STATE VETERINARY.

MISCELLANEOUS PROVISIONS FOR PREVENTION OF DISEASE AMONG HORSES, CATTLE, SHEEP, ETC.

APPOINTMENT—QUALIFICATION.

Sec. 2529. The State veterinary surgeon shall be appointed by the governor, subject to removal by him for cause, who shall hold office for three years. He shall be a graduate of some regularly established veterinary college, skilled in that science, and shall be by virtue of his office a member of the State board of health.

POWERS—REGULATIONS.

Sec. 2530. He shall have supervision of all contagious and infectious diseases among domestic animals in, or being driven or transported through, the State, and is empowered to establish quarantine against animals thus diseased, or have been exposed to others thus diseased, whether within or without the State and, with the concurrence of the State board of health, may make such rules and regulations as he may regard necessary for the prevention and suppression, and against the spread, of said disease or diseases, which rules and regulations the executive council concurring, shall be published and enforced, and in the performance of his duties he may call for the assistance of any peace officer.

DUTIES—DEPUTIES.

Sec. 2533. Whenever a majority of any board of supervisors or township trustees, or any city or town council, whether in session or not, shall in writing notify the governor of the prevalence of, or probable danger from, any of said diseases, he shall notify the veterinary surgeon, who shall at once repair to the place designated in said notice and take such action as the exigencies may demand and the governor may, in case of emergency, appoint a substitute or assistants with like qualifications and with equal powers and compensation.

DESTRUCTION OF STOCK—COMPENSATION—APPEAL.

Sec. 2534. Whenever in the opinion of the State veterinary surgeon the public safety demands the destruction of any stock, the same may be destroyed upon the written order of such surgeon, with the consent of the owner, or upon approval of the governor, and by virtue of such order such surgeon, his deputy or assistant, or any peace officer, may destroy such diseased stock, and the owner thereof shall be entitled to receive its actual value in its condition when condemned, to be ascertained and fixed by the State veterinary surgeon and the nearest justice of the peace, who, if unable to agree, shall call upon the nearest or other justice of the peace upon whom they agree as umpire, and their judgment shall be final when the value of the stock, if not diseased, would not exceed twenty-five dollars; but in all other cases either party shall have the right of appeal to the district court, but such appeal shall not delay the destruction of the diseased animals. The veterinary surgeon shall at once file with the governor his written report thereof, who shall, if found correct, endorse his finding thereon, whereupon the auditor of State shall issue his warrant therefor upon the treasurer of State, who shall pay the same out of any moneys at his disposal under the provisions of this act, but no compensation shall be allowed for stock destroyed while in transit through or across the State, and the word "stock" as herein used, shall be held to mean cattle, horses, mules and asses.

DISEASED ANIMALS KILLED.

Sec. 2339. The sheriff, constable, police officers, officer of any society for the prevention of cruelty to animals, or any magistrate shall destroy any horse or other animal disabled and unfit for further use.

SHEEP INSPECTOR.

Sec. 2343. The board of supervisors of any county, when notified in writing by five or more sheep owners of such county that sheep diseased with scab, or any other malignant, contagious disease, exist in such county, shall, at any regular or special meeting, appoint a suitable person as county sheep inspector, who shall take the oath of office, whose duties shall be as hereinafter prescribed, and whose term of office shall be for two years and until his successor is appointed and qualified.

TREATMENT OF DISEASED SHEEP.

Sec. 2344. It shall be the duty of the sheep inspector, upon the complaint of three or more sheep owners that any sheep within his jurisdiction have the scab or any other malignant, contagious disease, to immediately inspect and report in writing the result of his inspection to the county auditor, to be filed by him for reference by the board of supervisors or any party concerned And if he deem it necessary, in order to prevent the spread of the disease to the sheep of the other owners, he shall command the owner or agent to dip or otherwise treat such diseased sheep, and shall inspect such diseased sheep every month thereafter until such disease shall be eradicated.

EXPENSES.

Sec. 2345. It shall be the duty of the sheep inspector to dip or otherwise treat such diseased sheep, should the owner or agent refuse to do so, and all costs, expenses and charges, together with a per diem of three dollars per day, shall be charged against the owner of such sheep, and shall be lien thereon, and may be recovered in an action.

COMPENSATION OF INSPECTOR.

Sec. 2346. Such compensation for the inspector shall be three dollars per day, and shall be paid by the owner of the sheep, or his agent, if the disease is found to exist. In case no disease is found to exist, the complainants shall pay such fee.

INSPECTION OF SHEEP FROM OUTSIDE THE STATE.

Sec. 2347. Upon the arrival of any flock of sheep within the State from a distance of more than twenty miles outside the boundaries of the State, the owner or agent shall notify the inspector of the county in which such sheep are being held, and he shall inspect the flock at the expense of the owner or agent; and if the sheep are found sound shall furnish the owner or agent a certificate which shall be a passport to any part of the State; but sheep in transport on board of railroad cars, or passing through the State on such cars, shall not come within the provisions of this section. Any violation of, or failure to comply with the provisions of this and the four preceding sections by the owner of any sheep shall subject him to a forfeiture of not to exceed one hundred dollars, which shall be a lien on such sheep, and shall be recovered in an action by the county attorney in the name and for the use of the county.

BRINGING DISEASED SHEEP INTO THE STATE.

Sec. 5012. If the owner of sheep, or any person having the same in charge, knowingly import or drive into the State sheep having any contagious disease; or knowingly turn out or suffer any sheep having any contagious disease to run at large upon any common, road or uninclosed lands; or sell or dispose of any sheep, knowing the same to be so diseased, he shall be fined in any sum not less than fifty nor more than one hundred dollars.

ERADICATION OF HOG CHOLDRA.

REGULATIONS ACCEPTED.

Sec. 2350. The governor is hereby authorized to accept, on behalf of the State, any rules and regulations prepared by the secretary of agriculture of the United States for the eradication of hog cholera or swine plague, in one or more counties of this State, and he, together with the State veterinary surgeon, may co-with the government of the United States for the objects of this act.

FEDERAL INSPECTORS.

Sec. 2351. The inspectors of the bureau of animal industry of the United States department of agriculture shall have the right of inspection, quarantine and condemnation of animals affected with hog cholera or swine plague, or suspected to be so affected, or that have been exposed to this disease, and for these purposes are hereby authorized and empowered to enter upon any ground or premises. It is hereby made the duty of sheriffs, constables and peace officers to assist such inspectors when so requested; and said inspectors shall have the same powers and protection as peace officers while engaged in the discharge of their duties.

DISEASED ANIMALS DESTROYED—COMPENSATION.

Sec. 2352. Whenever any swine in the district specified in the regulations are found to be affected with or to have been exposed to hog cholera or swine plague, said swine may be condemned and destroyed; and the owners of all swine destroyed under the provisions of this act shall be entitled to receive a reasonable compensation therefor, but not more than the actual value in the condition when condemned. In case of failure on the part of the inspector and the owner to agree as to the amount of compensation, the swine shall be appraised by a board of citizens of this State, one of whom may be appointed by the inspector, one by the owner of the swine, and the two thus appointed shall select a third, and these together shall proceed to appraise the amount to be paid to the owner for the animals destroyed. Such appraisal shall be made under oath, and shall be final when the value of the animals does not exceed one hundred dollars, but in all other cases either party shall have the right of appeal to the district court, but such appeal shall not delay the destruction of the diseased or exposed animals.

EXPENSES.

Sec. 2353. All expenses of quarantine, condemnation and destruction of swine under the provisions of this act, and the expenses of any and all measures that may be used to eradicate hog cholera, shall be paid by the United States, and in no case shall this state be liable for any damages or expenses of any kind under the provisions of this act.

PENALTY.

Sec. 2354. Any person violating any order of quarantine made under this act, or any regulations prescribed by the secretary of agriculture and accepted by the governor of this State for the eradication of hog cholera, shall be guilty of a misdemeanor, and upon conviction shall be punished by a fine of not less than twenty-five dollars nor more than one hundred dollars.

SWINE DYING FROM DISEASE.

Sec. 5015. The owner or person having charge of any swine any of which die or are killed on account of any disease, shall upon such fact coming to his knowledge, immediately burn the same.

REPEAL—NOT TO BE DEALT IN.

Sec. 5016.—a. No person shall buy, sell, deal in or give away, or offer to buy, sell or deal in any swine that have died of any disease, or that have been killed on acount of any disease.

NOR CONVEYED ALONG HIGHWAY.

Sec. 5017. No person shall convey upon or along any public highway or other public ground, or any private land except that owned or leased by him, any diseased swine, or swine that died or have been killed on account of any disease.

Upon the trial for the violations of the provisions of this section, the proof that any person has hauled or is hauling dead swine from a neighborhood in which swine have been dying, or are at the time dying, from any disease, shall be presumptive evidence of his guilt.

ALLOWING DISEASED HOGS TO ESCAPE.

Sec. 5018. It shall be unlawful for any person negligently or wilfully to allow his hogs or those under his control, infested with any disease, to escape his control or run at large.

PENALTY.

Sec. 5019. Any person violating or failing to comply with any provisions of the four preceding sections shall be fined not less than five nor more than one hundred dollars, or be imprisoned in the county jail not to exceed thirty days, or both.

DISEASED HORSES, CATTLE, MULES, ETC.

BRINGING IN DISEASED HORSES, MULES, ETC.

Sec. 5013. If any person knowingly import or birng within the State any horse, mule or ass affected by the disease known as nasal gleet, glanders or button-farcey, or suffer the same to run at large upon any common, road or uninclosed land, or use or tie the same in any public place, or off his own premises, or sell, trade or offer for sale or trade any such animal, knowing the same to be so diseased, he shall be fined not less than fifty nor more than five hundred dollars, or be imprisoned not to exceed one year in the county jail, or both.

ALLOWING DISEASED HORSES, MULES, ETC., TO RUN AT LARGE.

Sec. 5014. If any horse, mule, or ass reasonably supposed to be diseased with nasal gleet, glanders or button-farcey be found running at large without any known owner, it shall be lawful for the finder thereof to take such animal, so found. before some justice of the peace, who shall forthwith cause the same to be examined by some veterinary surgeon, or other person skilled in such diseases, and if, on examination, it is ascertained to be so diseased, it shall be lawful for such justice of the peace to order such diseased animal to be immediately destroyed and buried; and the necessary expense accruing under the provisions of this section shall be defrayed out of the county treasury.

BRINGING DISEASED CATTLE INTO STATE.

Sec. 5020. Any person driving any cattle into state, or any agent, servant or employe of any railroad or other coporation who shall carry, transport or ship any cattle into this state, or any railroad company or other corporation or person who shall carry, ship or deliver any cattle into this state, or the owner, controller, lessee or agent or employe of any stock yard, receiving into such stock yard, or in any other enclosure for the detention of cattle in transit or shipment or reshipment or sale any cattle brought or shipped in any manner into this state, which at the time they were either driven, brought, shipped or transported into this state, were in such condition as to infect with or to communicate to other cattle pleuro-pneumonia, or splenitic or Texas fever, shall be fined not less than three hundred and not more than one thousand dollars, or be imprisoned in the county jail not exceeding six months, or both.

ACTION FOR DAMAGES.

Sec. 5021. Any person who shall be injured or damaged by any acts prohibited in the preceding section, in addition to the remedy therein provided, may recover the actual damages sustained by him from the person, agent, employe or corporation therein mentioned and neither said criminal proceeding nor said civil action shall be a bar to a conviction or to a recovery in the other.

CRUELTY AND MALICIOUS MISCHIEF TO ANIMALS.

INJURIES TO BEASTS.

Sec. 4818. If any person maliciously kill, maim or disfigure any horse cattle or any other domestic beast of another, or maliciously administer poison to any such animal, or expose any poisonous substances with intent that the same should be taken by such animal, he shall be imprisoned in the penitentiary not exceeding five years, or imprisoned in the county jail not exceeding one year, or be fined not exceeding three hundred dollars.

DRIVING AWAY STOCK.

Sec. 4819. If any person knowingly or willfully drive off, or suffer or permit to be driven off, any stock of another to a distance exceeding one mile from the residence of the owner, or of his agent having charge of such stock, or the range in which such stock is usualy in the habit of running, without the consent of such owner or agent. he shall be fined not exceeding one hundred dollars, or be imprisoned in the county jail not exceeding thirty days; and any justice of the peace in any county through which the stock thus driven off should pass, or in which it may be found, shall have jurisdiction of the offense.

DISTURBING STOCK.

Sec. 4820. Any person who knowingly discharges firearms of any description within, or in the immediate vicinity of, any inclosure where cattle, hogs or sheep are being fed for the purpose of fattening the same; on any person who enters such inclosure with firearms or dog, unless such person shall be the owner of said stock. or have the control of the same, or shall have permission from such owner or the person having control thereof to enter said premises, shall be guilty of a misdemeanor.

CRUELTY TO ANIMALS.

Sec. 4969. If any person torture, torment, deprive of necessary sustenance, mutilate, overdrive, cruelly beat or cruelly kill any animal, or unnecessarily fail to provide the same with proper food, drink, shelter or protection from the weather, or drive or work the same when unfit for labor, or cruelly abandon the same, or carry or cause the same to be cruelly carried on any vehicle, or otherwise, he shall be imprisoned in the county jail not exceeding thirty days, or be fined not exceeding one hundred dollars.

IMPOUNDING ANIMALS WITHOUT FOOD AND WATER.

Sec. 4972. If any person impound or confine, or cause to be impounded or confined, in any pound or other place, any creature. and fail to supply the same during such confinement with a sufficient quantity of food and water, he shall be guilty of a misdemeanor.

PURE FOOD LAWS RELATING TO DAIRY PRODUCTS.

IMITATION BUTTER OR CHEESE.

Sec. 2516. Every article, substitute or compound, save that produced from pure milk or cream from milk of cows, made in the semblance of or designed to be used for and in the place of butter, is imitation butter; and every article, substitute or compound, save that produced from pure milk or cream from milk of cows, made in the semblance of or designed to be used for and in the place of cheese, is imitation cheese. No one shall manufacture, have in his possession, offer to sell or sell, solicit or take orders for delivery, ship, consign or forward by any common carrier, public or private, and no common carrier shall knowingly receive or transport, any such imitation butter or cheese, except in the manner and subject to the regulations in this chapter provided.

SUBSTITUTE FOR BUTTER OR CHEESE—REGULATIONS AS TO SALES AND USE—TRANSPORTATION.

Sec. 2517. A substitute for butter and cheese, not having a yellow color nor colored in imitation of butter and cheese as prohibited in the next section, may be manufactured, kept in possession, offered for sale, sold, shipped, consigned or forwarded by common carriers, public or private, if each tub, firkin, box or other package in which the same is kept, offered for sale, sold, shipped, consigned or forwarded shall have branded, stamped or marked on the side or top thereof in the English language, in a durable manner, the words, "Substitute for butter" or "Substitute for cheese," as the case may be, the letters of the words to be not less than one inch in length by one half inch in width. The defacing, erasure, canceling or removal of this brand or mark, with intent to mislead, deceive, or violate any provision of this chapter, is prohibited. Such substitute for butter or cheese may be kept, used or served as a food or for cooking in hotels, restaurants, lunch counters, boarding houses or other places of public entertainment, only in case the proprietor or person in charge of such place shall display and keep constantly posted a card opposite each table or other place where the guests or others are served with the same, which card shall be white, at least ten by fourteen inches in size, the words, "Substitute for butter used here," or "Substitute for cheese used here," as the case may be, printed in black Roman letters of the same size as herein required to be placed upon the tubs, firkins, boxes or other package which substitute for butter or cheese is kept, and no other words or figures shall be printed thereon. No substitute for butter or cheese shall be offered for sale in the manufacturer's original package under the name of or for true butter or cheese made from the milk or cream of cows, nor shall any substitute for butter or cheese be offered for sale or sold unless the purchaser at the time was informed thereof. and, in addition, furnished with a printed statement in the English language in prominent type that the substance sold is such substitute, and giving the name and place of business of the maker. Nothing herein contained, however, shall be so construed so as to prohibit the transportation of imitation butter or cheese through and across the state.

COLORING—ADULTERATION.

Sec. 2518. No one shall color with any matter whatever any substance intended as a substitute for butter or cheese, so as to cause it to resemble true dairy products, or combine any animal fat, vegetable oil or other substance with butter or cheese, or combine with any substance whatever, intended as a substitute for butter or cheese, anything of any kind or nature for the purpose or with the effect of imparting to the compound the color of yellow butter or cheese, the product of the milk or cream from cows, or use, solicit orders for delivery, keep for sale or sell any such substance so colored and disguised as a substitute for butter or cheese; but nothing in this chapter shall be construed to prohibit the use of salt. rennet, or harmless coloring matter in making butter or cheese from such milk or cream.

PACKAGE BRANDED.

Sec. 2519. No one shall have in his possession or under his control, except for the actual consumption of himself or family, any substance designed as a substitute for butter or cheese, unless the tub, firkin, box or package holding the same is branded or marked as in this chapter required. Any person having in his possession or under his control such substance, not so branded or marked, shall be presumed to know its true character and name.

CONTRACTS INVALID.

Sec. 2520. No action shall be maintained in any of the courts of the state upon any contract or sale made in violation of or with the intent to violate any provision of this chapter by one who was knowingly a party thereto.

SEARCH WARRANTS—SAMPLES.

Sec. 2521. Whoever shall have in possession or control any imitation butter or cheese, or any substance designed to be used as a substitute for butter or cheese contrary to the provisions of this chapter, shall be held to have possession of property with intent to use it as a means of committing a pubilc offense, and all the provisions of the chapter relating to search warrants and proceedings thereon shall apply, except the officer serving the warrant, in addition to his duties as therein required, shall deliver to the dairy commissioner, or to a person by him authorized in writing to receive the same, a perfect sample of each article seized by virtue of such warrant, for the purpose of having the same analyzed, and forthwith return to the person from whom it was taken the remainder of each article seized. If any sample is found to be imitation butter or cheese, or substance designed to be used as a substitute for butter or cheese, it shall be returned to and retained by the magistrate for the purposes contemplated in said chapter on "search warrants and proceedings thereon," but if any sample be found not imitation butter or cheese, or a substance designed to be used as a substitute therefor, the value of the same shall be paid by the dairy commissioner as part of the expenses of his office, to the person from whom it was taken.

MILK DEALERS—MANUFACTURERS AND PACKERS—REPORTS—PENALTY.

Sec. 2522. Every city milk dealer, or every person furnishing milk or cream to such dealer, or the employe of such milk dealer, and every person or corporation, or the employe of such person or corporation, who operates a creamery, cheese or condensed milk factory, or reworks or packs butter, shall maintain his premises and utensils in a clean and hygenic condition, and shall make, upon blanks furnished by the dairy commissioner, such reports and statistics as may be required for the purpose of compiling statistics authorized by this chapter, and such dealer, owner, operator or business manager shall make such returns and reports within thirty days after receiving the proper blank form from the dairy commissioner and shall certify to the correctness thereof. Whoever shall violate any provision of this section shall be punished by a fine of not less than twenty-five nor more than one hundred dollars, or by imprisonment in the county jail for not more than thirty days.

MILK TEST.

Sec. 2523. Any person or corporation, or the employe of such person or corporation, who operates a creamery or cheese or condensed milk factory, and uses a chemical milk test to determine the quantity of butter fat in milk purchased, used or received, shall so use only such tests as shall be clear oil, free from any foreign substance, and produce correct measurements of butter fat, and every such person or corporation using a milk test shall procure from the dairy commissioner for each factory so operated, one standard tube or bottle, or one standard measure or pipette, for testing milk, certified and marked by him as in this chapter provided, which shall be kept for inspection by the patrons and used by such person or corporation in testing or verifying test tubes or bottles and milk measures or pipettes used. In any action arising between any such operator and patron, the burden of establishing the use of reliable tests and the results therefrom, equivalent to the standard herein provided, shall be upon the operator.

SAMPLES COLLECTED.

Sec. 2524. The commissioner may appoint agents in any city having over ten thousand inhabitants to collect from each dealer, not more than four times each month, samples of milk offered for sale therein. The agent shall make an accurate test of each sample received by him, and keep a true record thereof, with the name and location of the person from whom it was obtained, and report his work in detail to the commissioner, the compensation therefor not to exceed three dollars for each day actually employed therein.

PERMITS.

Sec. 2525. Any person or corporation who shall sell milk or cream from a wagon, depot or store, or sell or deliver milk or cream to a hotel or restaurant or boarding house, or any public place in any such city, shall be considered a city milk dealer. No such city milk dealer shall sell milk or cream from a wagon, depot or store in any such city without a written permit from the commissioner for each wagon, depot or store operated by him, for which he shall pay annually one dollar. All permits shall expire on the fourth day of July of each year, and no permit shall be issued for less than one dollar.

INSPECTION.

Sec. 2526. He or his agent may open any can or vessel containing milk or cream offered for sale in such city, and inspect its contents and take samples therefrom for testing or analysis. And any city milk dealer, or employe of such milk dealer, or any other person who shall resist or interfere with the commissioner or his agent in the performance of his duties in executing any of the requirements of this chapter, shall be guilty of a misdemeanor and punished as provided in this chapter.

PENALTIES.

Sec. 2527. Whoever shall violate any provision of this chapter shall be punished by a fine not exceeding five hundred dollars, or by imprisonment in the county jail not exceeding six months, or by both such fine and imprisonment, at the discretion of the court.

SALE OF IMPURE OR SKIMMED MILK—SKIMMED MILK—CHEESE LABELING

Sec. 4989. If any person shall sell, exchange, or expose for sale or exchange, or deliver or bring to another, for domestic or potable use, or to be converted into any product of human food, any unclean, impure, unhealthy, adulterated, unwholesome or skimmed milk, or milk from which has been held back what is commonly known as strippings, or milk taken from an animal having disease, sickness, ulcers, abscess or running sore, or which has been taken from an animal within fifteen days before or five days after parturition; or if any person, having cows for the purpose of producing milk or cream for sale, shall stable them in an unhealthy place or crowded manner, or shall knowingly feed them food which produces impure, unwholesome milk, or shall feed them distilled glucose or brewery waste in any state of fermentation, or upon any substance in a state of putrefaction or rottenness or of any unhealthy nature, or shall sell or offer for sale cream which has been taken from milk the sale of which has been prohibited, or who shall sell or offer for sale, as cream, an article which shall contain less than the amount of butter fat as prescribed in this chapter; or if any person shall sell or offer for sale any cheese manufactured from skimmed milk, or from milk that is partly skimmed without the same being branded, stamped or marked on the side or top of both cheese and package, in a durable manner, in the English language, the words "skimmed-milk cheese," the letters of the words to be not less than one inch in height and one half inch in width, he shall be fined not less than twenty-five nor more than one hundred dollars, and be liable for double damages to the person or persons upon whom such fraud shall be committed; but the provisions of this section shall not apply to skimmed milk when sold as such and in the manner and subject to the regulations prescribed in this chapter.

WHAT DEEMED ADULTERATED OR IMPURE MILK.

Sec. 4990. For the purpose of this chapter, the addition of water or any other substance or thing to whole milk or skimmed milk or partially skimmed milk, is hereby declared an adulteration, and milk which is obtained from animals fed upon waste as defined in this chapter, or upon any substance of any unhealthy nature, is hereby declared to be impure and unwholesome, and milk which is proved by any reliable method of test or analysis to contain less than twelve and one half per cent. of milk solids to the hundred pounds of milk, or than three pounds of butter fat to one hundred pounds of milk, shall be regarded as skimmed or partially skimmed milk, and every article not containing fifteen per cent. or more of butter fat shall not be regarded as cream.

ENFORCEMENT.

Sec. 4991. It is hereby made the duty of the dairy commissioner to enforce the provisions of the two preceding sections.

ADULTERATING FOOD OR LIQUOR.

Sec. 4982. If any person adulterate for the purpose of sale any substance intended for food, or any wine, spiritous, malt or other liquor intended for drinking, he shall be imprisoned in the county jail not more than one year, or be fined not exceeding three hundred dollars, and the article so adulterated destroyed.

OTHER ADULTERATION.

Sec. 4984. No person shall mix, color, stain, or powder, or order or permit any other person to mix, color, stain or powder, any article of food or confections with any ingredient or material so as to render the article injurious to health, with the intent that the same may be sold, and no person shall sell or offer for sale any such articles.

WITH INTENT TO SELL.

Sec. 4985. No person shall, except for the purpose of compounding in the necessary preparation of medicine, mix, color, stain or powder, or permit any other person to mix, color, stain or powder any drug or medicine with any ingredients or materials, so as to affect injuriously the quality or potency of such drug or medicine, with the intent to sell the same, or shall offer for sale any such drug or medicine.

LABELING.

Sec. 4986. No person shall mix, color, stain or powder any article of food, drink or medicine, or any article which enters into the composition of food, drink or medicine, with any other ingredient or material, whether injurious to health or not, for the purpose of gain or profit, or sell or offer for sale the same, or order or permit any other person to sell or offer for sale any article so mixed, colored, stained or powdered, unless the same be so manufactured, used or sold or offered for sale, under its true and appropriate name, and notice that the same is mixed or impure is marked, printed or stamped upon each package, roll, parcel or vessel containing the same, so as to be and remain at all times readily visible, or unless the person purchasing the same is fully informed by the seller of the true names of the ingredients (if cther than such as are known by the common name thereof) of such articles at the time of making the sale thereof or offering to sell the same; but nothing in this section shall prevent the use of harmless coloring material used in coloring butter and cheese.

GLUCOSE—SKIMMED MILK—CHEESE—OLEOMARGARINE.

Sec. 4987. No person shall mix any glucose or grape sugar with syrup or sugar intended for human food, or shall mix or mingle any glucose or grape sugar with any article, without distinctly marking, stamping or labeling the article or the package containing the same with the true and appropriate name of such article, and the percentage in which glucose or grape sugar enters into its composition. Nor shall any person sell or offer for sale, or permit to be sold or offered for sale, any such food, into the composition of which glucose or grape sugar has entered, without at the same time informing the buyer of the fact, and the proportion in which glucose or grape sugar has entered into the composition.

PENALTY.

Sec. 4988. Any person violating any provision of the four preceding sections shall, for the first offense, be fined not less than ten nor more than fifty dollars; for the second offense, not less than twenty-five nor more than one hundred dollars, or imprisoned in the county jail for not more than thirty days; for the third of any subsequent offense, not less than five hundred nor more than one thousand dollars, and imprisonment in the peitentiary not less than one nor more than five years.

FRAUD IN LARD FROM DISEASED HOGS.

Sec. 4992. All persons or associations that engage in the business of selling lard rendered from swine which have died of disease shall, before selling or offering to sell any such lard, plainly stamp, print or write upon the cask, barrel or other vessel containing it the words, "Lard from hogs which have died of disease;" or, if sold without such cask, barrel or other receptacles, the purchaser shall be informed that the lard is from hogs which have died of disease. For a violation of the provisions of this section he shall be fined not less than five nor exceeding one hunded dollars, or imprisoned in the county jail not exceeding thirty days.

COMPOUND LARD—LABELING.

Sec. 4993. No manufacturer or other person shall sell, deliver, prepare, put up, expose or offer for sale any lard, or any article intended for use as lard, which contains any ingredient but the pure fat of healthy swine in any tierce, bucket, pail, package or other vessel or wrapper, or under any label bearing the words "pure," "refined," "family," or either of said words alone or in combination with other words of like import, unless every tierce, bucket, pail, package, or vessel, wrapper or label in or under which said article is sold, delivered, prepared, put up, exposed or offered for sale bears on the top or outer side thereof, in letters not less than one half inch in length, and plainly exposed to view, the words, "Compound lard," and the name and proportion in pound and fractional parts thereof of each ingredient contained therein. Any person violating the provisions of this section shall be fined, for the first offense not less than twenty nor more than fifty dollars, and for each subsequent offense not less than fifty nor more than one hundred dollars.

CANNED FOOD—LABEL.

Sec. 4994. It shall be unlawful for any packer of or dealer in hermetically sealed, canned or preserved fruits, vegetables or other articles of food, not including canned or condensed milk or cream, to knowingly offer such canned or preserved articles for sale for consumption in this state, unless the cans or jars which contain the same shall bear the name, address and place of business of the person, firm or corporation that canned or packed the articles so offered, or the name of the wholesale dealer of the state who sells or offers the same for sale, together, in all cases, with the name of the state, city, town or village, where the same were packed plainly printed thereon, preceded by the words "packed at." Such name, address and place of business shall be plainly printed on the label, together with a mark or term indicating clearly the grade or quality of the articles contained therein.

SOAKED GOODS.

Sec. 4995. All packers of and dealers in soaked goods, or goods put up from products dried or cured before canning, shall in addition to complying with the provisions of the preceding section, cause to be plainly branded on the face of the label in legible type, one half of an inch in height and three-eighths of an inch in width, the word "Soaked."

PENALTY.

Sec. 4996. Any packer or dealer who shall violate any of the provisions of the two preceding sections shall be fined not more than fifty dollars for each offense in the case of retail dealers, and in case of wholesale dealers or packers, not less than five hundred nor more than one thousand dollars for each offense.

WHO DEEMED "PACKER" OR "DEALER."

Sec. 4997. The terms "packer" and "dealer," as used in the three preceding sections, shall include any firm or corporation doing business as a dealer in or packer of the articles mentioned therein.

INFORMATION BY BOARD OF HEALTH.

Sec. 4998. It shall be the duty of any board of health, cognizant of any violation of the provisions of the four preceding sections, to inform the county attorney, whose duty it shall be to institute proceedings against any person who is charged with a violation of such provisions, and in case of conviction he shall receive twenty-five per cent of the fines actually collected in addition to any salary otherwise provided for.

LAWS FOR THE PROTECTION OF FRUITS, TREES AND PLANTS.

SHADE TREES—TIMBER—DRAINAGE.

Sec. 1556. The road supervisor shall not cut down or injure any tree growing by the wayside which does not obstruct the road, or which stands in front of any town lot, inclosure or cultivated field, or any ground reserved for any public use, and shall not enter upon any lands for the purpose of taking timber therefrom without first receiving permission from the owner or owners of said lands, nor destroy or injure the ingress or egress to any property, or turn the natural drainage of the surface water to the injury of adjoining owners; but it shall be the duty of the supervisor to use strict diligence in draining the surface water from the public road in its natural channel, and to this end he may enter upon the adjoining lands for the purpose of removing obstructions from such natural channel that impede the flow of such water.

STATE ENTOMOLOGIST—ASSISTANTS—FEES.

Sec. 2575. The entomologist of the state experiment station is hereby constituted the State entomologist and charged with the execution of this act. He may appoint such qualified assistants as may be necessary, fix a reasonable compensation for their labor, and pay the same; and their acts shall have the same validity as his own. He shall, by himself, or his assistants, between the first day of June and the fifteenth day of September, in each year, when requested by the owner or agent or where he has reasonable grounds to believe the scale exists, carefully examine any nursery, fruit farm, or other place where trees or plants are grown for sale, and if found apparently free from the scale, he shall issue his certificate stating the facts, and shall collect therefor a fee of not less than five dollars, nor more than fifteen dollars, according to the amount inspected. It shall be unlawful to sell, or offer for transportation, any nursery stock outside the county where said nursery stock is grown unless accompanied by a copy of this certificate.

QUARANTINE—TREATMENT—COLLECTION OF COST.

Sec. 2575—d. The State entomologist shall have authority, when requested by the owner or agent, or when he has reasonable grounds to believe the scale exists, to enter upon any grounds, public or private, for the purpose of inspection, and, if he finds any nursery, orchard, garden, or other place infested by the scale, he may, by himself or his assistants enter upon such premises and establish quarantine regulations. If in his judgment the scale may be eradicated by treatment, he may, in writing, order such treatment, and prescribe its kind and character. In case any trees, shrubs, or plants are found so infested that it would be impracticable to treat them, he may order them burned. A failure for ten days after the delivery of such order to the owner or persons in charge to treat or destroy such infested trees or plants, as ordered, shall authorize the entomologist to perform this work by himself or his assistants, and to ascertain the cost thereof. He shall certify the amount of such cost to the owner or person in charge of the premises, and if the same is not paid to him within sixty days thereafter he shall certify the amount to the county auditor, who shall spread the same upon the tax books, to be collected as other taxes are, and turned over to the entomologist to become a part of the fund for carrying this act into effect.

INSPECTION OF NURSERY STOCK SHIPPED INTO STATE.

Sec. 2575—e. Where nursery stock is shipped into this state, accompanied by a certificate as herein provided, it shall be held prima facie evidence of the facts therein stated, but the state entomologist, by himself or his assistants, when they have reason to believe any such stock is infested with the scale, shall be authorized to inspect the same and subject it to like treatment as provided in section two of this act.

CERTIFICATE OF INSPECTION—PENALTIES.

Sec. 2575—f. It shall be unlawful for any person, firm, or corporation to bring into the state any trees, plants, vines, cuttings, and buds, commonly known as nursery stock unless accompanied by a certificate of inspection by a state entomologist of the State from which the shipment was made, showing that the stock has been inspected and found apparently free from the scale. Any person violating or neglecting to carry out the provisions of this act, or offering any hindrance to the carrying out of this act, shall be adjudged guilty of a misdemeanor and upon conviction before a justice of the peace shall be fined not less than ten dollars, nor more than one hundred dollars, for each and every offense, together with all the costs of the prosecution, and shall stand committed until the same are paid. All amounts so recovered shall be paid over to the state entomologist, and added to the fund herein provided for carrying out the provisions of this act.

TO FRUIT OR ORNAMENTAL TREE.

Sec. 4826. If any person maliciously or mischievously bruise, break, pull up, carry away, cut down, injure, destroy or sever from the land any fruit, ornamental or other tree, vine or shrub standing or growing on the land of another for ornament or use, he shall upon conviction thereof be punished by imprisonment in the county jail not more than one year, or by fine of not more than five hundred dollars, or both.

STEALING OR KNOCKING OFF FRUIT IN DAYTIME.

Sec. 4827. If any person maliciously or mischievously enter the inclosure of another with intent to knock off, pick, destroy or carry away, or, having lawfully entered, afterwards wrongfully knocks off, picks, destroys or carries away, any fruit or flower of any tree, shrub, bush or vine, he shall be fined for the first offense not less than five nor more than one hundred dollars, with the costs of conviction, or be imprisoned in the county jail not exceeding thirty days, and for a second violation he shall be fined not less than ten dollars and costs of conviction, or be imprisoned as above provided.

SAME IN NIGHT TIME.

Sec. 4828. If any person maliciously or mischievously enter the inclosure of another in the night time, and knock off, pick, destroy or carry away any fruit or flower of any tree, shrub, bush or vine, or if, having so entered with the intent to knock off, pick, destroy or carry away any fruit or flower as aforesaid, he be actually found therein, he shall be fined not less than twenty-five nor more than one hundred dollars and costs of conviction, or imprisoned in the county jail not exceeding thirty days.

LAWS AGAINST SPREAD OF NOXIOUS WEEDS AND PLANTS.

CANADA THISTLE—WRITTEN NOTICE.

Sec. 1562. The road supervisor, when notified in writing that any Canada thistles or any other variety of thistles are growing upon any lands or lots within his district, shall cause a written notice to be served on the owner, agent, or lessee of such lands or lots, if found within the county, notifying him to destroy said thistles within ten days from the service of said notice, and in case the same are not destroyed within such time, or if such owner, agent, or lessee is not found within the county, then the road supervisor shall cause the same to be destroyed, and make return in writing to the board of supervisors of his county, with a bill for his expenses or charges therefor, which in no case shall exceed two dollars per day for such services, which shall be audited and allowed by said board and paid from the county fund, and the amount so paid shall be entered up and levied against the lands or lots on which said thistles have been destroyed, and collected by the county treasurer the same as other taxes, and returned to the county fund.

WEEDS—DUTY OF ROAD SUPERINTENDENT.

Sec. 1562—a. It shall be the duty of road supervisors to cause to be cut, near the surface, all weeds on the public roads in their respective districts between the fifteenth day of July and the fifteenth day of August of each year. But nothing herein shall prevent the land owner from harvesting the grass grown upon the roads along his land in proper season.

RUSSIAN THISTLE—NOTICE.

Sec. 1563. No owner or occupant of any lands or lots, or corporation or association of persons owning, occupying or controlling land as right of way, depot grounds or other purposes, or public officer in charge of any street or road, shall allow to grow to maturity thereon the Russian thistle or salt wort (salsoli kali, variety tragus). It shall be the duty of every person or corporation so owning, occupying or controlling lands, lots or other real property, or any road supervisor or other public officer having charge of any street or road, to cut, burn or otherwise entirely destroy such thistle growing on said premises, right of way, road or street, before the same shall bloom or come to maturity; and any person, corporation or public officer neglecting to destroy all such thistles as aforesaid, after receiving notice in writing of their presence, shall be deemed guilty of a misdemeanor and be punished accordingly. It shall be the duty of any person knowing of the presence of Russian thistles upon any premises, lands, lots, streets, roads or elsewhere, at any time after the first day of July, to give notice immediately to any member of the board of trustees of the township in which thistles are growing; or, if within a city or town, then to give notice to the mayor, recorder, or clerk thereof, who shall immediately give notice in writing to the owner, occupant, or person or corporation in possession or conrtol thereof; and if not destroyed by such owner or occupant or person in possession in proper time to prevent maturity, cause their total destruction, the costs thereof, together with the costs of serving notice, to be paid out of the county fund upon the certificate of the township trustee or the council, as the case may be, to the board of supervisors; which board shall cause the sum so paid to be levied as a special tax against the premises upon which the thistles are growing, and against the person or corporation owning or occupying the same; which amount shall be collected by the county treasurer as other taxes, and paid into the county fund. Where township trustees have received notice, as aforesaid, of the presence of such thistles upon lands owned by the United States or this State, it shall be their duty to cause their destruction, and the costs thereof, upon proper certificate of the amount, shall be paid out of the county fund.

INFORMATION—BULLETIN.

Sec. 1564. A bulletin shall be prepared by the professor of agriculture of the agricultural college, briefly describing by words and cuts the Russian thistle, with the best known means of staying progress and effecting its extermination, which shall be printed by the state printer at public expense, from time to time, in such numbers as the secretary of state and said professor of agriculture may direct to supply the demand. A sum of money sufficient to pay for the cost of printing and making suitable plates for illustrating said bulletin is hereby appropriated from any funds in the state treasury not otherwise appropriated.

DISTRIBUTION.

Sec. 1565. The secretary of state shall furnish to the state agricultural college such number of said bulletins as it may desire to circulate, and also to county auditors, on their requisition, such number as may be necessary to supply all township and town or city officers with copies, and a sufficient number to distribute to all farmers desiring the same.

DISEASED HOP ROOTS OR CUTTINGS.

Sec. 5022. If any person use, transplant, cultivate or sell, or bring into state for the purpose of using, planting, cultivating or selling, ,any hop roots plants or cuttings which may be diseased in any manner, or infected with lice or vermin of any kind, or which may be brought from any state or country in which the cultivation of hops has been retarded or impaired by the presence of any disease, lice or vermin of a contagious character, he shall be fined not less than ten, nor more than one hundred dollars, and imprisoned not less than five nor more than twenty days.

SEIZURE AND DESTRUCTION OF DISEASED PLANTS.

Sec. 5023. If complaint is made before a justice of the peace by one or more responsible persons, that they have good reason to believe that hop roots have been introduced into or are being cultivated in the city or township where they reside in violation of the preceding section, the justice before whom such complaint is made shall issue a warrant authorizing any peace officer to seize such roots, and they shall be held in charge by such officer until action has been brought against the person so offending, and the cause determined; and in case it is found that the said plants, roots or cuttings are diseased, or are infected by lice or vermin of a contagious character, the officer before whom it is brought shall order said roots, plants or cuttings to be burned, charging the expense of doing the same as costs upon the party owning or cultivating the roots, plants or cuttings; and in no case shall he allow them to be planted or delivered to a third party until the fact is established that they are not infected with any vermin or disease of a contagious character.

CANADA THISTLES.

Sec. 5024. If any person or corporation, after having been notified in writing of the presence of Canada thistles on any lands owned or occupied by such person or corporation; or if any road supervisor, after having been notified in writing of the presence of any such thistles on the road under his jurisdiction, shall permit such thistles or any part thereof to blossom or mature, such person, corporation or road supervisor shall be guilty of a misdemeanor, and shall be punished by a fine not exceeding one hundred dollars or imprisonment in the county jail not more than thirty days.

FENCES—MISCELLANEOUS PROVISIONS CONCERNING.

PARTITION FENCES.

Sec. 2355. The respective owners of adjoining tracts of land, except timber land not used otherwise than for the timber thereon, from which each derives any revenue or benefit, shall be compelled to erect and maintain partition fences, or contribute thereto, and keep the same in good repair throughout the year, and if said fence be hedge, the owner thereof shall trim or cut it back once in two years to within five feet from the ground, unless such owners otherwise agree in a writing to be filed with and recorded by the township clerk.

POWERS OF FENCE VIEWERS.

Sec. 2356. The fence viewers shall have power to determine any controversy arising under this chapter, upon giving five days' notice in writing to the opposite party or parties, prescribing the time and place of meeting to hear and determine the matter named in said notice. Upon the request of any land owner, the fence viewers shall give such notice to all adjoining land owners liable for the erection, maintenance, rebuilding, trimming or cutting back, or repairing of a partition fence, or to pay for an existing hedge or fence. At said time and place the fence viewers shall meet and determine by written order the obligations, rights and duties of the respective parties in such matter, and assign to each owner the part which he shall erect, maintain, rebuild, trim or cut back, or pay for, and fix the value thereof, and prescribe the time within which the same shall be completed or paid for, and, in case of repair, may specify the kind of repairs to be made.

ASSIGNMENT OF PORTIONS.

Sec. 2357. In case a land owner desires to erect a partition hedge or fence when the owner of the adjoining land is not liable to contribute thereto, the fence viewers may assign to each owner the part which he shall erect, maintain, rebuild, and repair, trim or cut back, by pursuing the method provided in the preceding section; but the adjoinig owner shall not be required to contribute thereto until he becomes liable so to do, as elsewhere in this chapter provided.

DEFAULT—DOUBLE DAMAGES.

Sec. 2358. If the erecting, rebuilding, or repairing of such a fence be not completed within thirty days from and after the time fixed therefor in such order, the adjoining owner may do or complete the same, and the value thereof may be fixed by the fence viewers, and unless the sum so fixed, together with all fees of the fence viewers caused by such default, as taxed by them, is paid to the land owner so erecting, rebuilding, trimming or cutting back or repairing such fence, within ten days after the same is so ascertained; or when ordered to pay for an existing fence, and the value thereof is fixed by the fence viewers, and said sum, together with the fees of the fence viewers, as taxed by them, remains unpaid by the party in default for ten days, the person entitled thereto may recover double said sum, together with the fees so taxed, in an action by ordinary proceedings.

SERVICE OF NOTICE.

Sec. 2359. The notices by the fence viewers provided for in this chapter may be served upon any owner nonresident of the county where his land is situated, by publication thereof for two consecutive weeks in a newspaper printed in the county in which the land is situated, proof of which shall be made as in case of an original notice and filed with the fence viewers, and a copy delivered to the occupant of said land, or to any agent of the owner in charge of the same.

ORDERS—NOTICE.

Sec. 2360. All orders and decisions made by the fence viewers shall be in writing, signed by at least two of them, and filed with the township clerk. All notices in this chapter required to be given shall be in writing, and return of service thereof made in the same manner as notices in actions before a justice of the peace. Such orders, decisions, notices and returns shall be entered of record at length by the township clerk, and said record, or a copy thereof, certified to be such by such township' clerk, shall be competent evidence in all courts.

DIVISION RECORDED.

Sec. 2361. The several owners may, in writing, agree upon the portion of partition fences between their lands which shall be erected and maintained by each, which writing shall describe the lands and the parts of the fences so assigned, be signed and acknowledged by them, and filed and recorded in the office of the recorder of deeds of the county or counties in which they are situated.

HOW FAR BINDING.

Sec. 2362. Any order made by the fence viewers, or any agreement in writing between adjoining land owners, when recorded as in this chapter provided, shall bind the makers, their heirs and subsequent grantees, except, if the land of either shall cease to be used as a means for revenue or benefit, the same shall be inoperative while not thus used.

LANDS IN DIFFERENT TOWNSHIPS.

Sec. 2363. When the adjoining lands are situated in different townships in the same or different counties, the clerk of the township of the owner making the application shall select two trustees of his township as fence viewers, and the clerk of the other township one from his township, who shall possess, in such case, all the powers given to fence viewers in this chapter, but all orders, notices, and valuations and taxation of costs made by them must be recorded in both townships.

FENCE ON ANOTHER'S LAND.

Sec. 2364. When a person has made a fence or other improvement on an inclosure, which is found to be on land of another, such person may enter upon the land of the other and remove his fence or other improvement and material, upon his first paying, or offering to pay, the other party for any damage to the soil which may be occasioned thereby, and the value of an timber used in said improvement taken from the land of such other party, if any; and if the parties can not agree as to the damages, the fence viewers may determine them as in other cases; such removal shall be made as soon as practicable, but not so as to expose the crops of the other party.

LINE FENCES.

Sec. 2365. A person building a fence may lay the same upon the line between him and the adacent owners, so that it may be partly on one side and partly on the other, and the owner shall have the same right to remove it as if it were wholly on his own land.

FENCE ON ONE SIDE OF LINE.

Sec. 2366. The provisions concerning partition fences shall apply to a fence standing wholly upon one side of the division line.

LAWFUL FENCE DEFINED.

Sec. 2367. A lawful fence shall consist of three rails of good substantial material, or three boards not less than six inches wide and three-quarters of an inch thick, such rails or boards to be fastened in or to good substantial posts, not more than ten feet apart where rails are used, and not more than eight feet apart where boards are used, or wire either wholly or in part, substantially built and kept in good repair, or any other kind of fence, which, in the opinion of the fence viewers, shall be equivalent thereto, the lowest or bottom rail, wire or board not more than twenty nor less than sixteen inches from the ground, the top rail, wire or board to be between forty-eight and forty-four inches in height, and the center rail, wire or board not less than twelve inches nor more than eighteen inches above the bottom rail, wire or board; or it shall consist of three wires, barbed with not less than thirty-six iron barbs of two points each, or twenty-six iron barbs of four points each, on each rod of wire, or of four wires, two thus barbed and two smooth, the wires to be firmly fastened to posts not more than two rods apart, with not less than two stays between posts, or with posts not more than one rod apart, without such stays, the top wire to be not more than fifty-four nor less than forty-eight inches in height. All partition fences may be made tight by the party desiring it, and, at his election, the added material may be removed. In case adjoining owners or occupants of land shall use the same for pasturing sheep or swine, each shall keep his share of the partition fence in such condition as shall restrain such sheep or swine. Upon the application of either owner, after notice given as prescribed in this chapter, the fence viewers shall determinate all controversies arising under this section, including the use of partition fences made hog and sheep tight

WHERE STOCK RESTRAINED.

Sec. 2368. This chapter shall be construed the same in counties where stock is restrained from running at large as where not so restrained.

APPEAL.

Sec. 2369. An appeal may be taken to the district court from any order or decision of the fence viewers by any person affected, in the same manner appeals are taken from justices of the peace, except that the appeal bond shall be approved by the township clerk, in which event the township clerk, after recording the original papers, shall file them in the office of the clerk of the district court, certifying them to be such, and the clerk shall docket them, entitling the applicant or petitioner as plaintiff, and it shall stand for trial as other cases.

RECORD KEPT—FEES OF CLERK.

Sec. 2370. The township clerk shall enter all matters herein required to be made of record in his record book, and shall receive ten cents for each one hundred words in entering of record and making certified copies of the matters herein provided for, and twenty-five cents additional for his certificate thereto when required.

TRUSTEES—DUTIES.

Sec. 574. The township trustees are the overseers of the poor, fence viewers, and the township board of equalization, and board of health, and shall have charge of all cemeteries within the limit of their townships dedicated to public use, when the same are not controlled by other trustees or incorporated bodies.

TRIMMING HEDGES.

Sec. 1570. Owners of osage orange, willow, or any other hedge fence along the public road, unless the same shall be used as wind-break for orchards or feed lots, shall keep the same trimmed, by cutting back within five feet of the ground at least once in every two years, when so ordered by the trustees of their respective townships, and burn or remove the trimmings so cut from the road.

Upon a failure to comply with the foregoing provision, the road supervisor shall immediately serve notice in writing upon the owner of the hedge to trim the same, and if he fails to do so for sixty days thereafter, such supervisor shall cause the same to be done at a cost not exceeding forty cents per rod, which shall be paid for out of the road fund, and make return thereof to the township clerk, who shall, in certifying the lands upon which the road tax has not been paid, include the lands along which the hedge has been trimmed, together with the amount paid therefor, which shall be collected by the county treasurer in the manner other county taxes are collected.

Where the one district system is adopted as provided in this chapter, it shall be the duty of the township trustees to enforce the foregoing provision.

DUTY OF BOARDS OF SCHOOL DIRECTORS—FENCE.

Sec. 2745.—a. It shall be the duty of all boards of school directors in school districts where the schoolhouse site adjoins the cultivated or improved lands of another to build and maintain a lawful fence between said site and cultivated or improved lands.

MISCELLANEOUS PROVISIONS.

WEIGHTS, MEASURES AND INSPECTION.

Sec. 3009. The standard weights and measures now in charge of the secretary of state, furnished by the government of the United States, shall be the standard of weights and measures throughout the state.

LENGTH AND SURFACE.

Sec. 3010. The unit or standard measure of length and surface, from which all other measures of extension, whether they be lineal, superficial or solid, shall be derived and ascertained, shall be the standard yard now in possession of the secretary of state, furnished by the government of the United States. It shall be divided into three equal parts called feet, and each foot into twelve equal parts called inches, and for the measure of cloths and other commodities commonly sold by the yard, it may be divided into halves, quarters, eighths and sixteenths. The rod, pole or perch shall contain five and a half such yards, and the mile, one thousand seven hundred and sixty such yards.

LAND MEASURE.

Sec. 3011. The acre for land measure shall be measured horizontally and contain ten square chains, and be equivalent in area to a rectangle sixteen rods in length and ten in breadth, six hundred and forty such acres being contained in a square mile. The chain for measuring land shall be twenty-two yards long, and divided into one hundred equal parts, called links.

WEIGHTS.

Sec. 3012. The units or standards of weight, from which all other weights shall be derived and ascertained, shall be the standard avoirdupois and troy weights, as furnished this state by the United States. The avoirdupois pound, which bears to the troy pound the ratio of seven thousand to five thousand seven hundred and sixty, shall be divided into sixteen equal parts called ounces: the hundred weight shall consist of one hundred avoirdupois pounds, and twenty hundred weight shall constitute a ton. The troy ounce shall be equal to the twelfth part of a troy pound.

LIQUIDS.

Sec. 3013. The unit or standard measure of capacity for liquids, from which all other measures of liquids shall be derived and ascertained, shall be the standard gallon and its parts, as furnished this state by the government of the United States. The inch or gauge of cream shall be one half of a standard gallon. The barrel shall be thirty-one and a half gallons, and two barrels shall constitute a hogshead.

SUBSTANCES NOT LIQUIDS.

Sec. 3014. The unit or standard measure of capacity for substances not liquids, from which all other measures of such substances shall be derived and ascertained, shall be the standard half-bushel, furnished this state by the United States, and the peck, half-peck, quarter-peck, quart and pint measures, for measuring commodities not liquids, shall be derived from the half-bushel by successively dividing that measure by two.

BUSHEL BY WEIGHT.

Sec. 3016. A bushel of the respective articles hereafter mentioned will mean the amount of weight in this section specified:

Wheat	sixty pounds.
Shelled corn	fifty-six pounds.
Corn on the cob	seveny pounds.
Rye	fifty-six pounds.
Oats	thirty-two pounds.
Barley	forty-eight pounds.
Potatoes	sixty pounds.
Beans	sixty pounds.
Bran	twenty pounds.
Clover seed	sixty pounds.
Timothy seed	forty-five pounds.
Flax seed	fifty-six pounds.
Hemp seed	forty-four pounds.

Buckwheat	fifty-two pounds.
Bluegrass seed	fourteen pounds.
Castor beans	forty-six pounds.
Dried peaches	thirty-three pounds.
Dried apples	twenty-four pounds.
Onions	fifty-seven pounds.
Salt	fifty pounds.
Stone coal	eighty pounds.
Charcoal	twenty pounds.
Coke	thirty-eight pounds.
Sweet potatoes	forty-six pounds.
Lime	eighty pounds.
Sand	one hundred and thirty pounds.
Hungarian grass seed	fifty pounds.
Millet seed	fifty pounds.
Osage orange seed	thirty-two pounds.
Sorghum saccharatum seed	thirty pounds.
Broom corn seed	thirty pounds.
Apples, peaches or quinces	forty-eight pounds.
Cherries, grapes, currants or gooseberries	forty pounds.
Strawberries, raspberries or blackberries	thirty-two pounds.

MASON WORK OR STONE.

Sec. 3017. The perch of mason work or stone consists of twenty-five feet cubic measure.

HOP BOXES.

Sec. 3018. The standard size for all boxes used in packing hops shall be thirty-six inches long, eighteen inches wide, and twenty-three and one-fourth inches deep, inside measurement.

LANDLORD AND TENANT.

APPORTIONMENT OF RENT.

Sec. 2988. The executor of a tenant for life who leases real estate so held, and dies on or before the day on which the rent is payable, and a person entitled to rent dependent on the life of another may recover the proportion of rent which has accrued at the time of the death.

TENANT HOLDING OVER.

Sec. 2989. A tenant, giving notice of his intention to quit leased premises at a time named, and afterwards holding over, and a tenant or his assignee wilfully holding over after term, and after notice to quit, shall pay double the rental value thereof during the time he holds over to the person entitled thereto.

ATTORNMENT TO STRANGER.

Sec. 2990. The payment of rent, or delivery of possession of leased premises, to one not the lessor, is void, unless made with his consent, or in pursuance of a judgment or decree of court or judicial sale.

TENANT AT WILL—NOTICE TO QUIT.

Sec. 2991. Any person in the possession of real estate, with the assent of the owner, is presumed to be a tenant at will until the contrary is shown, and thirty days' notice in writing must be given by either party before he can terminate such a tenancy; but when in any case, a rent is reserved payable at intervals of less than thirty days, the length of notice need not be greater than such interval. In case of tenants occupying and cultivating farms, the notice must fix the termination of the tenancy to take place on the first day of March, except in cases of mere croppers, whose leases shall be held to expire, when the crop is harvested; if the crop is corn, it shall not be later than the first day of December, unless otherwise agreed upon. But where an agreement is made fixing the time of the termination of the tenancy, whether in writing or not, it shall cease at the time agreed upon, without notice. When a tenant can not be found in the county, the notice above required may be given to any sub-tenant or other person in possession of the premises, or, if the premises be vacant, by affixing the notice to any outside door of the dwelling house thereon, or other building, if there be no dwelling-house, or in some conspicuous position on the premises, if there be no building.

LANDLORD'S LIEN.

Sec. 2992. A landlord shall have a lien for his rent upon all crops grown upon the leased premises, and upon any other personal property of the tenant which has been used or kept thereon during the term and not exempt from execution, for the period of one year after a year's rent, or the rent of a shorter period, falls due; but such lien shall not in any case continue more than six months after the expiration of the term. In the event that a stock of goods or merchandise, or a part thereof, subject to a landlord's lien, shall be sold under judicial process, order of court, or by an assignee under a general assignment for benefit of creditors, the lien of the landlord shall not be enforceable against said stock or portion thereof, except for the rent due for the term already expired, and for rent to be paid for the use of demised premises for a period not exceeding six months after date of sale, any agreement of the parties to the contrary notwithstanding.

ATTACHMENT.

Sec. 2993. The lien may be effected by the commencement of an action, within the period above described, for the rent alone, in which action the landlord will be entitled to a writ of attachment, upon filing with the clerk or justice a verified petition stating that the action is commenced to recover rent accrued within one year previous thereto upon premises described in the petition; and the procedure thereunder shall be the same, as nearly as may be, as in other cases of attachment, except no bond shall be required. If a lien for rent is given in a written lease or other instrument upon additional property, it may be enforced in the same manner and in the same action.

STATUTE OF FUNDS—CONTRACTS WHICH MUST BE RENDERED IN WRITING.

Sec. 4625. Except when otherwise specially provided, no evidence of the following enumerated contracts is competent, unless it be in writing and signed by the party charged or by his authorized agent:

1. Those in relation to the sale of personal property, when no part of the property is delivered and no part of the price is paid;
2. Those made in consideration of marriage;
3. Those wherein one person promises to answer for the debt, default or miscarriage of another, including promises by executors to pay the debt of the decedent from their own estate;
4. Those for the creation or transfer of any interest in lands, except leases for a term not exceeding one year;
5. Those that are not to be performed within one year from the making thereof.

EXCEPTIONS.

Sec. 4626. The provisions of the first subdivision of the preceding section do not apply when the article of personal property sold is not at the time of the contract owned by the vendor and ready for delivery, but labor, skill or money is necessarily to be expended in producing or procuring the same: nor do those of the fourth sub-division apply where the purchase money, or any portion thereof, has been received by the vendor, or when the vendee, with the actual or implied consent of the vendor, has taken and held possession thereof under and by virtue of the contract, or when there is any other circumstance which, by the law heretofore in force, would have taken the case out of the statute of frauds.

PART XI.

IOWA STATE FAIR—ITS EARLY HISTORY, ETC.

View of Iowa State Fair Grounds—looking east.

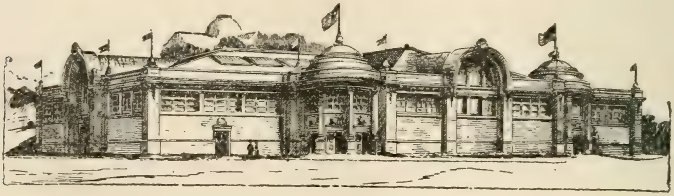
ORGANIZATION AND GROWTH OF THE IOWA STATE FAIR.

The first movement for the holding of a State fair was at a meeting of the board of directors of the Jefferson County Agricultural society, held at Fairfield, Iowa, October 13, 1853. (It will probably be of interest to note that at this time Iowa was the only free State in the Union not holding an annual State fair.) At this meeting a motion was made by Mr. C. W. Slagle, and adopted by the society, whereby the officers of the society were instructed to take immediate steps to effect the organization of a State agricultural society, and that they use their influence to have said society hold its first annual exhibition at Fairfield in October, 1854.

A committee was appointed to confer with the different agricultural societies of the State and invite them to send delegates to a meeting to be held at Fairfield on the 28th day of December, 1853, for the purpose of effecting a State organization. It was urged that not only farmers, but mechanics, merchants and professional men, interest themselves in the movement, and all were invited to attend.

The day of the convention delegates representing Jefferson, Henry, Lee, Van Buren and Wapello counties were present. The society was duly organized, and the preamble to the constitution adopted provided that the style of the society should be the "Iowa State Agricultural Society," and that its object would be "for the promotion of agriculture, horticulture, manufactures, mechanics and household arts."

The first president elect was Hon. Thos. W. Clegett of Lee county, and the first secretary Dr. J. M. Shaffer of Jefferson county. The latter is still living, and an active practitioner of medicine at Keokuk, Iowa.



New Agricultural, Horticultural and Dairy building to be erected on State Fair Grounds, 1904

On the date of organization it was decided to hold the first annual exhibition at Fairfield on the 24th and 25th of October, 1854. The grounds secured contained about six acres adjoining Fairfield and were enclosed by a rail fence ten feet high. The main building was a shed two hundred and fifty feet in length erected on one side of the grounds next to the fence, and contained a table five feet in width running its entire length, upon which were placed exhibits. On the opposite side of the enclosure rails were used for the erection of stalls and pens for live stock exhibits.

The first premium list offered, among other things, premiums to be on the following: "Team of oxen, not less than three yoke, " "Best and biggest fattened hog," "Native or dunghill fowls," "Ox yoke," "Grain cradle," "Arrangement for raising water, other than pump," "Mattock," "Corn sheller," "Handpower," etc., all of which would be curiosities to the younger generation of today.

It appears from the treasurer's report that the total receipts from the first fair were about $1,000, "after deducting counterfeit and otherwise worthless money," of which there seems to have been plenty.

Continuous since the year 1854 an annual State fair has been held at different cities in the State, with the exception of 1898 when it was thought best to miss a year on account of the Trans-Mississippi exposition at Omaha, Nebraska.

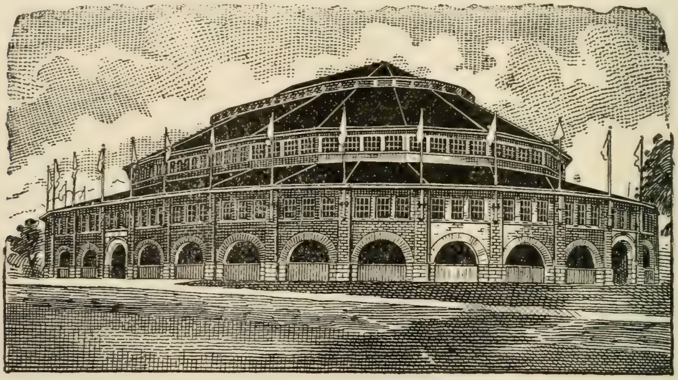
In 1879 the fair was located permanently at Des Moines, on West Grand avenue. The present grounds, containing two hundred sixty-six acres, were secured by an act of the Twenty-first General Assembly appropriating $50,000 for the purchase thereof. The people of Des Moines donated a like amount for the erection of buildings.

The following table shows town or city in which fair was held each year, also total receipts and premiums paid:

Year.	Where Held.	Receipts.	Premiums.
1854	Fairfield	$ 1,000	$ 1,000
1855	Fairfield	1,900	1,109
1856	Muscatine	3,100	1,834
1857	Muscatine	3,059	1,679
1858	Oskaloosa	2,843	1,622
1859	Oskaloosa	2,166	1,982
1860	Iowa City	3,721	2,307
1861	Iowa City	2,056	2,055
1862	Dubuque	3,576	2,544
1863	Dubuque	4,454	3,988
1864	Burlington	7,877	3,349
1865	Burlington	8,522	4,183
1866	Burlington	4,460	3,680
1867	Clinton	9,527	3,947
1868	Clinton	7,132	4,810
1869	Keokuk	12,075	4,775
1870	Keokuk	11,287	7,013
1871	Cedar Rapids	19,464	6,988
1872	Cedar Rapids	18,691	6,559
1873	Cedar Rapids	17,392	4,096
1874	Keokuk	15,286	10,066
1875	Keokuk	12,266	8,075
1876	Cedar Rapids	22,924	8,920
1877	Cedar Rapids	27,965	10,130
1878	Cedar Rapids	17,813	7,739
1879	Des Moines	28,626	9,726
1880	Des Moines	26,278	13,271
1881	Des Moines	30,975	13,653
1882	Des Moines	39,515	13,165
1883	Des Moines	42,535	17,476
1884	Des Moines	40,579	19,864
1885	Des Moines	26,976	14,928
1886	Des Moines	39,384	18,802
1887	Des Moines	38,747	18,015
1888	Des Moines	44,553	19,279
1889	Des Moines	55,881	21,911
1890	Des Moines	56,555	23,753
1891	Des Moines	57,301	24,601
1892	Des Moines	55,262	26,769
1893	Des Moines	25,435	22,630
1894	Des Moines	26,597	19,200
1895	Des Moines	43,860	17,698
1896	Des Moines	43,449	16,404
1897	Des Moines	47,509	16,444
1899	Des Moines	55,455	17,894
1900	Des Moines	56,577	18,562
1901	Des Moines	54,467	19,101
1902	Des Moines	67,122	21,787
1903	Des Moines	63,979	23,813

It will be noted that from a crude beginning the fair has steadily grown until it now ranks as one of the greatest State fairs in the United States. Entries to the number of one thousand, made by not more than two score of exhibitors at the first State fair, have grown until they now number over fifteen thousand, representing about eight hundred exhibitors.

Premiums in every department have been increased from year to year, with the result that the Iowa State fair ranks among the first in number and high class of exhibits. To this must be attributed the success of the fair, for to succeed there must be a well-balanced exhibit.



Live Stock Pavilion on State Fair Grounds.

The management of the State fair is now under the control of the State Board of Agriculture, the old State Agricultural Society having been legislated out of existence by the Twenty-eighth General Assembly, when the law creating the Department of Agriculture was passed.

Following is a list of officers and directors of the Iowa State Agricultural society from its organization to the time it became a department of the State, and of the officers and members of the State Board of Agriculture from its creation to the present time:

IOWA STATE FAIR UNDER THE AUSPICES OF IOWA STATE AGRICULTURAL SOCIETY, OFFICERS, DATES AND PLACES OF HOLDING.

Year.	Date of Fair.	President.	Vice President.	Secretary.	Treasurer.	Where Held.
1854	Oct. 25 to 27	Thos. W. Claggett	D. B. Inskeep	J. M. Shaffer	W. B. Chamberlain	Fairfield.
1855	Oct. 9 to 12	Thos. W. Claggett	D. B. Inskeep	J. M. Shaffer	C. Baldwin	Fairfield.
1856	Oct. 18 to 20	Thos. W. Claggett	L. Byington	J. H. Wallace	J. G. Gordon	Muscatine.
1857	Oct. 6 to 9	Thos. W. Claggett	L. Byington	J. H. Wallace	J. G. Gordon	Muscatine.
1858	Sept. 27 to 30	Dr. J. Bowen	Z. T. Fisher	J. H. Wallace	Rob't Seevers	Oskaloosa.
1859	Sept. 27 to 29	Z. T. Fisher	W. W. Hamilton	J. H. Wallace	Rob't Seevers	Oskaloosa.
1860	Oct. 2 to 5	Geo. G. Wright	Mark Miller	J. H. Wallace	M. L. Morris	Iowa City.
1861	Sept. 24 to 27	Geo. G. Wright	Mark Miller	J. H. Wallace	M. L. Morris	Iowa City.
1862	Sept. 30 to Oct. 3	Geo. G. Wright	Dr. Geo. Sprague	J. H. Wallace	Mark Miller	Dubuque.
1863	Sept. 15 to 18	Geo. G. Wright	Peter Melendy	J. M. Shaffer	Edwin Smith	Dubuque.
1864	Sept. 27 to 30	Geo. G. Wright	Peter Melendy	J. M. Shaffer	Edwin Smith	Burlington.
1865	Sept. 26 to 29	Peter Melendy	Jas. D. Wright	J. M. Shaffer	Edwin Smith	Burlington.
1866	Sept. 18 to 21	Peter Melendy	Jas. D. Wright	J. M. Shaffer	Edwin Smith	Burlington.
1867	Oct. 1 to 4	Peter Melendy	Jas. D. Wright	J. M. Shaffer	Geo. Sprague	Clinton.
1868	Sept. 29 to Oct. 2	Peter Melendy	Jas. D. Wright	J. M. Shaffer	Geo. Sprague	Clinton.
1869	Sept. 14 to 17	Peter Melendy	Jas. D. Wright	J. M. Shaffer	Geo Sprague	Keokuk.
1870	Sept. 13 to 16	E. R. Shankland	S. F. Spofford.	J. M. Shaffer	C. F. Davis	Keokuk.
1871	Sept. 12 to 15	E. R. Shankland	S. F. Spofford	J. M. Shaffer	Peter Melendy	Cedar Rapids
1872	Sept. 10 to 13	Jno. Scott	Edwin Smith	J. M. Shaffer	W. B. Leach	Cedar Rapids
1873	Sept. 9 to 12	Jno. Scott	Edwin Smith	J. M. Shaffer	W. B. Leach	Cedar Rapids
1874	Sept. 22 to 25	Oliver Mills	M. W. Robinson	J. R. Shaffer	S. S. Sample	Keokuk.
1875	Sept. 27 to Oct. 1	Oliver Mills	M. W. Robinson	J. R. Shaffer	S. S. Sample	Keokuk.
1876	Sept. 11 to 16	Oliver Mills	M. W. Robinson	J. R. Shaffer	S. C. Bever	Cedar Rapids
1877	Sept. 17 to 21	S. F. Spofford	Jno. Grinnell	J. R. Shaffer	S. C. Bever	Cedar Rapids
1878	Sept. 14 to 20	S. F. Spofford	Jno. Grinnell	J. R. Shaffer	S. C. Bever	Cedar Rapids
1879	Aug. 30 to Sept. 6	F. L. Downing	C. F. Clarkson	J. R. Shaffer	J. G. Rounds	Des Moines.
1880	Sept. 3 to 11	F. L. Downing	E. F. Brockway	J. R. Shaffer	J. G. Rounds	Des Moines.
1881	Sept. 4 to 12	Jno. W. Porter	E. F. Brockway	J. R. Shaffer	J. G. Rounds	Des Moines.
1882	Aug. 31 to Sept. 8	Jno. W. Porter	Jas. Wilson	J. R. Shaffer	J. G. Rounds	Des Moines.
1883	Aug. 30 to Sept. 7	Wm. T. Smith	E. F. Brockway	J. R. Shaffer	J. G. Rounds	Des Moines.
1884	Aug. 29 to Sept. 6	Wm. T. Smith	H. C. Wheeler	J. R. Shaffer	Geo. M. Maish	Des Moines.
1885	Sept. 3 to 11	Wm. T. Smith	H. C. Wheeler	J. R. Shaffer	Geo. M. Maish	Des Moines.
1886	Sept. 2 to 10	H. C. Wheeler	J. J. Snouffer	J. R. Shaffer	Geo. M. Maish	Des Moines.
1887	Sept. 2 to 10	H. C. Wheeler	J. J. Snouffer	J. R. Shaffer	Geo. M. Maish	Des Moines.
1888	Aug. 31 to Sept. 7	H. C. Wheeler	John Hays	J. R. Shaffer	C. B Worthington	Des Moines.
1889	Aug. 30 to Sept. 6	John Hays	J. D. Brown	J. R. Shaffer	C. B. Worthington	Des Moines.

IOWA STATE FAIR—CONTINUED.

Year.	Date of Fair.	President.	Vice President.	Secretary.	Treasurer.	Where Held.
1890	Aug. 29 to Sept. 5	John Hays	J. D. Brown	J. R. Shaffer	C. B. Worthington	Des Moines.
1891	Aug. 28 to Sept. 4	Albert Head	J. W. McMullin	J. R. Shaffer	C. B. Worthington	Des Moines.
1892	Aug. 26 to Sept. 2	J. W. McMullin	John A. Evans	J. R. Shaffer	C. B. Worthington	Des Moines.
1893	Sept. 1 to 8	J. W. McMullin	John A. Evans	J. R. Shaffer	C. B. Worthington	Des Moines.
1894	Aug. 31 to Sept 8	John A. Evans	F. N. Chase	P. L. Fowler	Albert Head	Des Moines.
1895	Sept. 6 to 14	John A. Evans	W. W. Field	P. L. Fowler	G. D. Ellyson	Des Moines.
1896	Sept. 4 to 12	John A. Evans	W. W. Field	P. L. Fowler	G. D. Ellyson	Des Moines.
1897	Sept. 9 to 19	W. W. Field	John Cownie	P. L. Fowler	G. D. Ellyson	Des Moines.
1898	None held	John Cownie, resigned April 1 W. F. Harriman, from April 1	W. F. Harriman, to April 1. R. J. Johnston, from April 1.	P. L. Fowler	G. D. Ellyson	Des Moines.
1899	Aug. 25 to Sept 2	W. F. Harriman	R. J. Johnston	G. H. Van Houten	G. D. Ellyson	Des Moines.

*IOWA STATE FAIR, UNDER AUSPICES OF THE IOWA DEPARTMENT OF AGRICULTURE.

Year.	Date of Fair.	President.	Vice President.	Secretary.	Treasurer.	Where Held.
1900	Aug. 24 to Sept 1	R. J. Johnston	J. C. Frasier	G. H Van Houten	G. D. Ellyson	Des Moines.
190.	Aug. 23 to Sept 1	J. C. Frasier	W. W. Morrow	J. C. Simpson.	G. D. Ellyson	Des Moines.
1902	Aug. 22 to 30	W. W. Morrow	C. E. Cameron	J. C Simpson.	G. D. Ellyson	Des Moines.
1903	Aug. 21 to 29.	W. W. Morrow	C. E. Cameron	J. C. Simpson	G. D. Ellyson	Des Moines.

*By Chapter 28, acts of the Twenty-eighth General Assembly, the Iowa State Agricultural Society was legislated out of existence, and the above department created.

BOARD OF DIRECTORS OF THE IOWA STATE AGRICULTURAL SOCIETY.

Year.	Directors.									
1854	Three directors elected from each county society in state.									
1855	Forty directors elected.									
1856	Twenty-four directors elected.									
1857	Thirty directors elected.									
1858	T. K. Brooks	J. M. Cannon	Isaac Booth	L. W. Babbitt	G. Olds	M. Fisher	M. L. Morris	C. H. Dudley	J. D. Wright	H. G. Stuart
1859	K. Brooks	J. M. Cannon	Isaac Booth	L. W. Babbitt	G. W. Kincaid	H. Olmstead	M. L. Morris	P. Melendy	J. D. Wright	H. G. Stuart
1860	T. K. Brooks	J. M. Cannon	Geo. Sprague	O. Mills	G. W. Kincaid	H. Olmstead	M. L. Morris	P. Melendy	J. D. Wright	H. G. Stuart
1861	T. K. Brooks	J. M. Cannon	Geo. Sprague	O. Mills	H. Baily	H. Olmstead	R. Seevers	P. Melendy	J. D. Wright	H. G. Stuart
1862	T. K. Brooks	W. S. Eddy	Edwin Smith	O. Mills	H. Baily	P. Cadwell	R. Seevers	P. Melendy	J. D. Wright	W. M. Robinson
1863	T. K. Brooks	W. S. Eddy	Timothy Day	O. Mills	E. Shanklank	P. Cadwell	R. Seevers	O. O. St. John	J. D. Wriget	W. M. Robinson
1864	S. F. Spofford	W. S. Eddy	Timothy Day	O. Mills	E. Shankland	P. Cadwell	R. Seevers	O. O. St John	J. D. Wright	W. M. Robinson
1865	S. F. Spofford	W. S. Eddy	Timothy Day	O. Mills	E. Shankland	P. Cadwell	R. Seevers	A. D. Adkins'n	S. B. Hewitt, Jr.	W. M. Robinson
1866	S. F. Spofford	C. T. Lamson	Timothy Day	O. Mills	E. Shankland	P. Cadwell	R. Seevers	A. D. Adkins'n	S. B. Hewitt, Jr.	W. M. Robinson
1867	S. F. Spofford	C. T. Lamson	Timothy Day	O. Mills	E. Shankland	P. Cadwell	R. Seevers	J. H. Bacon	S. B. Hewitt, Jr.	W. M. Robinson
1868	S. F. Spofford	Milo Smith	Timothy Day	O. Mills	E. Shankland	P. Cadwell	R. Seevers	J. H. Bacon	S. B. Hewitt, Jr.	W. M. Robinson
1869	S. F. Spofford	Milo Smith	Timothy Day	O. Mills	E. Shankland	P. Cadwell	F. L. Downing	E. Smith	S. B. Hewitt, Jr.	W. M. Robinson
1870	J. M. Tuttle	Milo Smith	P. McIsaacs	O. Mills	J. Grinnell	P. Cadwell	F. L. Downing	E. Smith	S. B. Hewitt, Jr	J. H. Bacon
1871	J. M. Tuttle	Milo Smith	P. McIsaacs	O. Mills	J. Grinnell	John Scott	F. L. Downing	E. Smith	S. B. Hewitt, Jr	J. H. Bacon
1872	M. W. Robins'n	P. Cadwell	P. McIsaacs	O. Mills	J. Grinnell	C. F. Davis	F. L. Downing	J. W. Porter	S. B. Hewitt, Jr.	A. Kimble
1873	M. W. Robins'n	P. Cadwell	P. McIsaacs	O. Mills	J. Grinnell	C. F. Davis	F. L. Downing	J. W. Porter	S. B. Hewitt, Jr.	A. Kimble
1874	P. McIsaacs	H. D. Noble	J. J. Snouffer	P. Cadwell	J. Grinnell	C. F. Davis	F. L. Downing	J. W. Porter	S. B. Hewitt, Jr.	E. S. Fonda
1875	C. Close	S. H. Mallory	J. J. Snouffer	P. Cadwell	J. Grinnell	C. F. Davis	F. L. Downing	J. W. Porter	D. M. Flinn	E. S. Fonda
1876	N. S. Ketchum	S. H. Mallory	J. J. Snouffer	C. E. Hedges	J. Grinnell	G. C. Duffield	F. L. Downing	J. W. Porter	D. M. Flinn	F. B. Stacy
1877	N. S. Ketchum	S. H. Mallory	J. J. Snouffer	C. E. Hedges	O. Mills	G. C. Duffield	F. L. Downing	J. W. Porter	E. N. Clark	F. B. Stacy
1878	N. S. Ketchum	G. H. Wright	J. J. Snouffer	Jas. Wilson	O. Mills	G. C. Duffield	F. L. Downing	J. W. Porter	E. N. Clark	F. B. Stacy
1879	N. S. Ketchum	G. H. Wright	J. J. Snouffer	Jas. Wilson	E. N. Clark	J. W. Porter	G. C. Duffield	Geo. Gray	S. A. Knapp	F. B. Stacy
1880	L. S. Coffin	J. T. Beebe	J. J. Snouffer	Jas. Wilson	E. N. Clark	J. W. Porter	G. C. Duffield	Geo. Gray	S. A. Knapp	F. B. Stacy
1881	L. S. Coffin	J. T. Beebe	J. J. Snouffer	Jas. Wilson	H. C. Wheeler	W. T. Smith	G. C. Duffield	Geo. Gray	R. C. Webb	F. B. Stacy
1882	L. S. Coffin	F. N. Chase	J. J. Snouffer	L. C. Baldwin	H. C. Wheeler	W. T. Smith	G. C. Duffield	Geo. Gray	R. C. Webb	F. B. Stacy
1883	L. S. Coffin	F. N. Chase	J. J. Snouffer	L. C. Baldwin	H. C. Wheeler	J. D. Brown	G. C. Duffield	H. B. Griffin	R. C. Webb	F. B. Stacy
1884	L. S. Coffin	F. N. Chase	J. J. Snouffer	L. C. Baldwin	L. F. Newell	J. D. Brown	G. C. Duffield	H. B. Griffin	R. C. Webb	F. B. Stacy
1885	L. S. Coffin	F. N. Chase	J. J. Snouffer	L. C. Baldwin	L. F. Newell	J. D. Brown	G. C. Duffield	H. B. Griffin	R. C. Webb	F. B. Stacy
1886	P. Wells	F. N. Chase	John Hays	L. C. Baldwin	L. F. Newell	J. D. Brown	G. C. Duffield	H. B. Griffin	R. C. Webb	F. B. Stacy
1887	P. Wells	F. N. Chase	John Hays	L. C. Baldwin	H. I. Smith	J. D. Brown	J. A. Evans	H. B. Griffin	R. C. Webb	F. B. Stacy
1888	C. C. Carpent'r	F. N. Chase	P. G. Ballingall	L. C. Baldwin	H. I. Smith	J. D. Brown	J. A. Evans	H. B. Griffin	R. C. Webb	J. W. McMullin
1889	C. C. Carpent'r	F. N. Chase	P. G. Ballingall	L. C. Baldwin	H. I. Smith	W. W. Field	J. A. Evans	H. B. Griffin	R. C. Webb	J. W. McMullin
1890	S. S. Sessions	F. N. Chase	P. G. Ballingall	L. C. Baldwin	H. I. Smith	W. W. Field	J. A. Evans	H. B. Griffin	R. C. Webb	J. W. McMullin
1891	S. S. Sessions	F. N. Chase	P. L. Fowler	L. C. Baldwin	H. I. Smith	W. W. Field	J. A. Evans	H. B. Griffin	R. C. Webb	A. H. Grissell
1892	S. S. Sessions	F. N. Chase	P. L. Fowler	G. W. Franklin	H. I. Smith	W. W. Field	J. Manatrey	H. B. Griffin	R. C. Webb	B. J. Moore
1893	S. S. Sessions	F. N. Chase	P. L. Fowler	G. W. Franklin	D. Sheehan	W. W. Field	J. Manatrey	H. B. Griffin	C. C. Prouty	B. J. Moore

BOARD OF DIRECTORS OF THE IOWA STATE AGRICULTURAL SOCIETY—CONTINUED.

Year.	Directors.
1894	R. J. Johnston. W. F. Har'im'n J. C. Frazier.. C. H. Bacon.. D. Sheehan... W. W. Field. J. Manatrey. J Cownie ....C. C. Prouty... B. J Moore.
1895	J. C. Frazier. B. J. Moore... C H. Bacon.... W. F. Har'im'n R. J. Johnston J. P. M'nat y C. E Cameron John Cownie. Ben. F. Elbert. D. Sheehan.
1896	J. P. Manatrey C. E. Cameron John Cownie... Ben F. Elbert. D. Sheehan.. J. C. Frazier. L. H. Pickard M. J. Wragg. W. F Harriman R. J. Johnston..
1897	J. C. Frazier. L. H. Pickard. M. J. Wragg... W F Har'im'n R. J. Johnston J. P. M'nat'y C E. Cameron. G. W. Franklin A. L Plummer D. Sheehan.
1898	J. P. Manatrey, C. E. Cameron, Geo. W. Franklin, A. L. Plummer, D. Sheehan, *G. L. Johnson, J. C. Frazier, L. H. Pickard, M. J. Wragg, J. W. Wadsworth, †John Howat.
1899	J. C. Frazier, L. H. Pickard, M. J. Wragg, J. W. Wadsworth, John Howat, J. P. Manatrey, C. E. Cameron, W. W. Morrow, A. L. Plummer, D. Sheehan.

STATE BOARD OF AGRICULTURE.

1900	Ex Officio: Governor of State, President Iowa State College, Ames, State Dairy Commissioner, State Veterinarian. J. P. Manatrey, C. E. Cameron, W. W. Morrow, A. L. Plummer, D. Sheehan, W. C. Brown, L. H. Pickard, M. J. Wragg, J. W. Wadsworth, John Howat.
1901	Ex Officio: Governor of State, President Iowa State College, Ames, State Dairy Commissioner, State Veterinarian. J. P. Manatrey, C. W. Phillips, W. C. Brown, R. T. St. John, S. B. Packard, T. C. Legoe, M. J. Wragg, W. W. Morrow, M. McDonald, J. W. Wadsworth, C. E. Cameron.
1902	Ex Officio: Governor of State, President Iowa State College, Ames, State Dairy Commissioner, State Veterinarian. J. P. Manatrey, C. W. Phillips, W. C. Brown, R. T. St. John, S. B. Packard, T. C. Legoe, M. J. Wragg, John Ledgerwood, M. McDonald, J. W. Wadsworth, C. E. Cameron.
1903	Ex Officio: Governor of State, President Iowa State College, Ames, State Dairy Commissioner, State Veterinarian. J. P. Manatrey, C W. Phillips, W. C. Brown, R. T. St. John, S. B. Packard, T. C. Legoe, M. J. Wragg, John Ledgerwood, M. McDonald, J. W. Wadsworth, H. L. Pike.

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* Appointed April, 1, 1898, to fill vacancy caused by election of R. J. Johnston to vice presidency.

† Elected for one year to fill vacancy caused by resignation of John Cownie.

AMES SCHOLARSHIP GOES TO ELLIS RAIL.

Homestead.

Ellis Rail, of Birmingham, Iowa, won the $200 scholarship in the State agricultural college offered by the State department of agriculture to the young man who, in an open contest, at the State fair of 1903, would show himself the best judge of corn and live stock. Mr. Rail won the contest by a margin of about 67 points, securing 343 points as against 277½ won by his nearest competitor, M. S. Barclay, of West Liberty. C. W. Robb, of Newton, had 275 points, and while Mr. Rail secures the scholarship, Messrs. Barclay and Robb were given honorable mention.

There were twenty-four contestants for the scholarship. Their markings ranged from 162 points to 343 points, won by Rail. The judging of the ear of corn was measured at thirty points, and of these the winner won 21, being surpassed by L. J. Andrews, of Morse, who got 24½ points out of the 30; Arthur Jay, of Blakesburg, who got 22½, and M. J. Kelso, of Corydon, who got 27½. M. R. Barton, of Roscoe, also had 21. In the total score on corn judging, however, Mr. Rail had 76 points, while his nearest competitor was H. J. Lytle, of Oskaloosa, who got 72. In the stock judging Mr. Rail got 267 points, Mr. Barclay 222, H. C. Shayner, of Pocahontas 209, Mr. Robb 220, and Mr. Andrews 221.

ELLIS RAIL.

The following table gives the markings of the judges, showing the name of the contestant, his address, his score on the ear of corn, his total score on judging corn in the second column, his total in judging stock in the third, and his total score, being the sum of the second and third columns, for all in the fourth, this determining the contest:

Contestants.	Ear.	Corn.	Stock.	Total.
Carl Freeman, Norwalk	18½	48½	186	234½
H. C. Schayner, Pocahontas	16	56½	209	265½
M. R. Barton, Roscoe	21	44	145	199
B. W. Steele, Winterset	15	31	107	188
C. W. Robb, Newton	11½	55	220	275
L. C. Person, Sibley	7	46	198	244
R. F. Bennett, Ames	5½	50½	162	212½
Ellis Rail, Birmingham	21	76	267	343
F. G. Boland, Williamsburg	5½	34	171	205
G. S. Gleason, Mechanicsville	12	47½	141	183½
M. D. Kelso, Corydon	27½	52	110	162
C. R. Stout, Stout	19½	59½	138	197½
J. B. Mitchell, Shenandoah	20	71	163	234
John Hethershaw, Des Moines	19½	50	169	219
F. S. Bell, Hancock	15	50½	137	187½
J. H. Bader, Ware	17	54	164	218
R. H. Stoner, South English	13½	49½	164	213½
H. J. Lytle, Oskaloosa	22	72	151	223
L. J. Andrews, Morse	24½	45½	221	264½
M. S. Barclay, West Liberty	17	55½	222	277½
Arthur Jay, Blakesburg	22½	66	168	234
A. R. Leffer, Hillsboro	19	45½	169	214½
M. J. Hester, Ames	20	52	204	256
Ralph Baldwin, Osceola	10	36½	153	189½

Professor Holden of the department of agronomy of the Iowa State College, had charge of the corn judging. Each contestant was required to select one ear of corn, the highest possible score being 30. Each contestant was also required to pass on two varieties of corn, white and yellow, of ten ears each, placing the ears, first, second and third and

M. S. BARCLAY.

so on, giving in writing reasons for so doing. For correctness of placing a score of 40 was possible, and for the reasons substantiating the placing a score of 30.

After the corn judging the young men were set to work judging a class of cows, Red Polled, and then a ring of two-year-old grade steers. They were also required to judge a ring of aged Percheron stallions, and also a ring of harness horses. Prof. W. J. Rutherford, of Ames, had charge of this and general direction of the contest. After the animals were judged by the contestants they were judged by Prof. C. F. Curtiss.

FAIRS AS EDUCATORS.

Breeders' Gazette.

The public-spirited agriculturists who are laboring earnestly for the establishment of a State fair in Tennessee through public aid are encouraged by the friendly sentiment which exists in the legislature now in session. The appropriation they seek is certainly modest enough, but it appears there is some danger of the defeat of the bill on the ground that larger appropriations are deemed necessary for educational work in that State. This one fact should insure aid for the establishment of a State fair. Such exhibitions are essentially educational in their character. The liberal appropriations of public funds which have been made by many of the States for such fairs rest on no other ground. Fairs are not held for purposes of amusement, nor primarily to encourage trade. Incidentally some features may serve as entertainment and certainly a fair stocked with well-displayed exhibits is calculated to promote the purchase of animals and implements of value to the farmer, but this is part and parcel of its educational character. The fundamental idea of such exhibitions is to bring the farmer in touch with better stock, better implements and better methods, and purchase naturally follows the acquisition of knowledge of improved material and methods.

The educational value of such fairs is time-proved. It is no longer in argument among those who have had observation of the practical benefits which flow from such exhibitions. Vast sums have been added to the wealth of the agricultural world by reason of the ideas and information acquired by study of fairs. The Tennessee legislators who are seeking to strengthen the cause of education in that State should consider the State fair proposition directly in line with their effort. Such a fair would prove a great factor in the education of the class of people on whose intelligent use of the soil depends in a very large measure the material prosperity of the State. Farmers in Tennessee should advise their legislators to this effect. The preliminary work has been done by disinterested, determined men. The matter is now under consideration in the legislature, but some members are hesitating lest money set apart for use in the establishment of a fair representative of the agriculture of the State shall be deemed as diverted from educational channels. The live farmers of that great old State should by personal appeals to their representatives and senators remove any such serious misconception. State aid for agricultural fairs is an investment that touches the material as well as the mental condition of agriculturists. It is educational in the highest sense of the word.

THE SOCIAL SIDE OF THE STATE FAIR.

Wallaces' Farmer.

The complaint of isolation has long been made against farm life. Rural delivery, the rural telephone and the extension of railroad and interurban facilities have done much in the past few years to remove this isolation. These do not, however, remove it altogether. It is necessary for the farmer and as many of his family as possible to get entirely away from the farm once a year and meet with their kindred and friends, whether of country or city, and enjoy the rest and recreation which such meetings invariably bring. The State fairs which are now beginning and will be continued for several weeks in the Mississippi valley furnish a most excellent opportunity for social fellowship. The necessity for this social fellowship is laid very deep in human nature. If our readers will turn to Leviticus, 23:39-44, they will see that provision was made for this kind of life in the ancient Israelitish code. There were three great ingatherings every year at which as far as possible the families were expected to attend, and one of them corresponds very nearly with our State fair. It was the harvest festival, and during that festival the people were required absolutely to dwell in tents or booths, as recorded in the passage above quoted.

We sometimes think that healthy, normal development of humanity requires that once a year we should get out of the house and go into tents, getting an abundance of fresh air, sleep such as can not be found in the best bed at home, and get away as far as possible from the conventionalities and restrictions of house life. We sometimes think there must have been a good deal of scrapping for brush when the hosts of Israel met to build their tents, probably ending in fights for the best palm leaves, willow brushes and straight brush. There will be none of this at the State fairs this year, for farmers can bring their tents with them or the tent and awning companies will rent them wherever desired. There will be no long journeys for water, for pipes are laid all over most fair grounds and all that you have to do is to turn the faucet. Wherever farmers can possibly do so, they should bring their farm teams, their provisions, fried chickens, hams, butter, cheese, and other good things too numerous to mention, and should leave only enough of their family at home to take care of the stock and see that things are going right there, and attend the fair.

The State fairs give opportunities for farmers to meet with old friends, friends they have not seen for many years, old soldiers to meet with their comrades, young folks to meet with their cousins and have a first-class outing. We do not know of anything that really equals the advantages afforded by a first-class State fair such as are being held each year in all the Western states. Where farmers can not attend, by all means let them send their boys and girls. Do not be afraid for these young folks. They will not get hurt on the cars. They will not do anything out of the way unless there is some bad blood in them for which the parents are responsible. We have a very vivid recollection of attending our first fair, now half a century ago. It was a great revelation to us. It showed us how big a world there was outside of the farm. The live stock, the machinery, the agricultural and horticultural exhibits, all these are wonderful educators.

The boys have had a hard summer's work; the girls have probably worked just as well if not as hard as the boys, and it is time now for them to have an outing. Let them have it. Do not stint the expense. Do not me uneasy about them. Let them see what a great, big world this is, and what a great, big State their State is. Let them size up the other boys and girls there from country and town. Let them see something of the people who live in towns and get some idea of town life. It will do them all good. They will go home tired, hungry perhaps for some of mother's cooking, but they will be all the better for it. It will give them something to think about for years to come.

The Iowa State fair, to be held August 21-29, gives every promise of being one of the finest fairs the State has ever held. The facilities for observation are better this year than ever before. The boys who are interested in the live stock will have an excellent opportunity to see the judging and to pass judgment themselves. The girls will be interested in the horticultural, the poultry and the dairy exhibits, and both will be ablet o measure themselves with other boys and girls and to measure the character of the people among whom they are likely to live the rest of their days.

Speaking of the Iowa State fair, we think the finest exhibit on the grounds is always the people, for man is greater than any of his works; the farmer is far more than the live stock he breeds. The grains grown on his farm are the measure of his manhood. The women of the State are always far superior to their handiwork as exhibited at the fair. Each State is largely what the people of the State have made it; therefore, the attendance at the fair is nearly always more interesting than the fair itself.

STATE FAIRS.

By Col. J. B. Killebrew, in Southern Farm Magazine.

The State of Texas is to be highly commended for the deep interest which it takes in its State fair. For the present year the fair will begin on September 26th and will close on October 11th. It is said that this State fair has already run longer than any similar institution in the world, and its popularity continues unabated. It has been a strong factor in the development of the State, and its influence for good has been manifested in the growth along all industrial and agricultural lines.

This success of the Texas State fair suggests an inquiry why so few States have kept up these valuable institutions. A State fair is a sign of progress. It is an evidence of a worthy ambition that exists among the people to elevate the agricultural conditions of the State. In the present age advertisements underlie all successful business pursuits, and experience has demonstrated that no method is so efficient for this purpose, from an industrial point of view, as the holding of expositions and fairs. Fairs appeal more immediately to the people of the State than great expositions. Their tendency is to awaken a new ambition among every class, which leads to a healthy development. For the most part, State fairs are used for the display of those products that originate in the State. They are short, local expositions, intensive and restricted in their plans, rapid in their movements, and successful in their ends. Scene succeeds scene in quick succession, and there is an animation excited that is contagious. People will flock to a well-conducted fair as they come out on special days to an exposition. Where they are held every year thrifty, well-to-do farmers usually look forward to a grand holiday occasion where the best things are to be collected for their instruction, edification and amusement. Taken in its broadest sense a fair is a school where the young and old may learn new lessons from the display of concrete objects. A fair is a great book which all may read and enjoy. It is a living treatise on all products—aesthetic, mineral, vegetable and animal—gathered and classified so as to convey to the observer the largest degree of practical knowledge. A fair is a place where the newest experiments in agriculture are exchanged, new ideas disseminated and the best methods of cultivating the various crops are made known. An exhibition of wheat, for instance; how it was fertilized, how the land was prepared, its variety, its time of ripening and its yield, may be the dumb but potent preceptor to a thousand farmers. The same lessons may be taught in varying degree by the exhibits of all other crops that are or may be grown within the boundaries of the State where the fair is held.

In the improvement of live stock, however, the value of fairs is of the greatest importance. The best animals of every breed are brought forward, their good points studied, their pedigrees made known and their excellent qualities determined. The interest taken in stock exhibitions is the best sign of progress. Wherever the cultivators of the soil are stimulated by competition to an improvement of their domestic animals the improvement of the soil is sure to follow. No instance in the history of agriculture can be pointed out where an improved agriculture did not follow in the wake of improved domestic animals. For a long period the agriculture of England languished and the yield of agricultural products in the United Kingdom was reduced to such a low point as to threaten the very existence of the nation.

Every well-informed man knows that at the beginning of the eighteenth century the agriculture of England was of the rudest character. The land, for the most part, was unenclosed. Stock of all kinds ran together upon the commons, the fields were cropped in succession until they were well-nigh exhausted. The quarter of a century immediately following 1760 is memorable in the history of English agriculture for the many improvements made. To the genius of Blakewell is due the extraordinary improvement made in domestic animals, and especially in the character of sheep, which proved the foundation stone of a new agriculture. With sheep came turnips, and with the depasturing of turnips came improvement to the soil. Longhorn cattle were succeeded by shorthorn or Durham cattle. Merino sheep were introduced by George III., who, however inefficient as a statesman, was an energetic and zealous farmer. The Bath and West of England Society was established in 1777, the Highland Society in 1784, and the National Board of Agriculture in 1793. These various societies by their exhibitions and publications infused such a measure of intelligence and inquiry through all ranks of society as to bring about a wonderful progress in agricultural development.

Through the influence of these societies and the stimulus given to agriculture by the Napoleonic wars the rental of land in Scotland rose from £2,000,000 in 1795 to £5,278,685 in 1815. The live stock interest increased more rapidly than any other. The consumption of meat was out of all proportion to that of bread grains. To meet this demand there were more green crops and more live stock, from which resulted more wool, more meat, more manure and more grain crops. The productiveness of the soil was greatly increased. Land was made to do quadruple the duty it performed a century before. Agriculture as a science and an art was steadily advanced, and to the numerous local agricultural associations which sprang up all over the United Kingdom collecting and disseminating information and giving exhibitions of live stock and agricultural products are these great improvements to be ascribed.

With agricultural fairs will come, first, improvement in live stock. With improvement in live stock will come increased fertility in the soil. With increased fertility in the soil will come agricultural prosperity and development. Where fairs are encouraged and the live stock interest promoted every other branch of agriculture will flourish.

Not only that, but the social value of fairs is not to be overlooked. They attract men of intelligence, of observation, of experience and of progressive thought. They bring the people together from various portions of the State and make them acquainted with one another. A fair is, therefore, broadening in its effect and patriotic in its tendencies. It breaks down local prejudices, it encourages the making of new experiments, it elevates the farmer in his own estimation and in the estimation of all classes in the community, it creates a bustling trade, breaks the monotony of country life and makes it enjoyable. Fair-days are gala-days, full of life and hope and happiness. They are often referred to as the beginning point of some new industry or some new method of cultivation or some new uses applied to old things. A fair is the occasion of kindly greeting of people from all portions of the country. It induces a feeling of good-will and amity, revives trade by stimulating inquiry, and its influence is felt to be one of the prime motive powers among the best agricultural classes.

The establishment of State fairs, therefore, would be a wise provision for the elevation and prosperity of the States. The small amount necessary for that purpose would be inappreciable when compared with the good results which would follow. Wise legislators will look to the future and to the building up of those industries which are to pay the largest proportion of the taxes for the maintenance of the government. It is to be doubted if any appropriations have ever been made for a State fair that have been disapproved by the great mass of voters. Those States that have built up such enterprises are precisely those which are advancing most rapidly in all industrial pursuits and are attracting the largest amount of immigration and capital to their borders. The great States of New York, Illinois, Missouri, Minnesota, Nebraska, Iowa, Indiana and Massachusetts appropriate large sums every year for their State or county fairs. North Carolina, the most progressive State in the South, but with probably the most infertile soils, holds its annual fair at Raleigh, and the result is shown in the rapid progress which it is making in the building up of industrial establishments.

A STATE FAIR EPISODE.

Ruralist.

The State Fair had been permanently located near the beautiful little city of D. M., and had already held two successful exhibitions, and spent much of the intervening time in preparing the grounds, erecting buildings for the exhibits of various kinds, etc.

Very little of this had reached the ears of Grandpa Hadley, until a few weeks ago, when he received one of the premium lists, made doubly attractive by pictures of the new buildings that were shown.

Some way, fairs had become associated in Grandfather Hadley's mind with horse-racing, betting, games of chance, etc., and while he delighted in a good horse race, and in past years had seen some racing, yet there were memories of certain past experiences connected with a horse race and some nearby games, of which Grandma Hadley had never heard. But this was different, and as the old gentleman looked at the pictures of the horse-barns, sheep and swine building, poultry palace and the beautiful halls for agricultural displays, he grew excited.

"I vum, mother, I'm going to that fair," he said as his white-haired, placid-faced wife entered the room.

"I wouldn't swear," said grandma severely, then with marked interest, "The fair at D. M.? Mary told me yesterday that John was going to take up some hogs, and said if we wanted to visit your brother, this would be a good chance, as the railroads were giving cheap rates."

"Let's go," cried grandpa; "you see it begins the 17th of August and lasts a whole week. There won't be much work doing on the farm."

"The 17th of August," mused grandma, "is the anniversary of our wedding. We were married forty years ago, and then we went to St. Louis and stayed two whole days. Do you remember it, father?"

"Remember it? I reckon I do, and this will be our second wedding trip. I was proud of you then, mother, and thought your red cheeks and curly brown hair the prettiest in the world, but you are better looking now."

"Don't be a fool," retorted grandma, giving him a push.

It was finally all arranged. John, the son-in-law, was to see the old people safely to the city, where, after a visit of a day or two, they could attend the fair as much as they chose.

Frank, the unmarried son, would remain at home and "see to things," and many were the directions that the careful housewife gave him regarding the chickens and flowers and milk; "and don't forget to feed the dog and cat every meal, for you know they get hungry as well as you do."

Frank promised and laughingly said: "If you meet my sweetheart up at the fair be good to her."

Grandma's face sobered. This sweetheart was the cause of so many sad thoughts, for the dear old lady couldn't see why Frank should have remained single until past thirty and then fall in love with a city girl.

Nothing Frank could say made the matter any easier for grandma, and though she had never seen the girl, Elizabeth Graham by name, the thoughts of a city girl in the old farm home seemed sadly out of place, that dear, homely, comfortable home, with its many duties and pleasures that had so fully satisfied Mrs. Hadley. "I'll tell you what, Frank, if I see her I'll kiss her for you," said his father, who was in high spirits.

"You never will get any sense," commented his wife.

How little it takes to give pleasure, after all, if the mind is only in a receptive mood, and we are willing to be pleased; and so it was with this couple. The ride on the cars past farm houses and villages, the bustling, noisy crowd at the depot, the streets full of people, all hurrying somewhere, were items of much interest. The big buildings that lined either side of the street, and the gaily dressed windows were duly noticed, but best of all was the fair.

After a long ride on the street car, they reached the fair grounds, and hand in hand jostled with the crowd, until finally they were inside, with a long day before them to spend in seeing the many interesting things.

The fruit display pleased both, but the old gentleman drew back from the flowers which he said "were not half so fine as those at home in the garden."

A pretty girl standing near smiled at the old gentleman's assertion, a smile so bright and full of sympathy that both old people were instantly drawn toward her.

"It's a fact," repeated grandpa, "she has wagon loads of flowers prettier than anything here," and he motioned toward his wife.

"Why father, how you do talk. Them's nothing but Dahlies." Then turning to the girl, "He always did think Dahlias the finest flowers that grow, and will help me with them any time, though he does grumble dreadful when I want him to make flower beds for anything else."

"Dahlias are beautiful," responded the girl, "and Thursday there will be a grand display here. Cut flowers are shown on that day. I hope you can come and see them. I have twenty varieties which I will bring in then."

"We'll be here, sure," said grandpa. Then while the sweet-faced old lady talked to the pretty, sociable girl, grandpa did some hard thinking.

"Twenty varieties! Humph!" and grandpa thought of the long rows at home, surely a hundred varieties.

A little talk with the man inside the railing made things clear, and the old gentleman decided to give grandma a surprise, and that girl, too.

"Though," grandpa said to himself, "she seems a real likely sort of a girl, with no nonsense about her. Must have been raised on a farm."

Full of his scheme he was glad when his wife said the young lady would show her around while grandpa could go and see John and the stock.

Promising to meet at the same place at noon, they separated, grandpa to find John and unfold his wonderful scheme of sending a telegram to Frank to cut all of grandma's Dahlias and ship them by express so they would get there Thursday morning, and John promised to attend to everything and not let "mother" know a word about it.

Meanwhile the two ladies were looking at the beautiful display of fancy work, chatting like old friends, for between the two there seemed to be a mutual attraction that neither cared to resist.

The sweet old face plainly told the story of a loving, simple life, devoted to home and its duties, but willing to be interested in all mankind, and at once won the girl's heart, while the cordial friendliness of the girl, who yet had a certain stately reserve of manner that was very pleasing to the older woman.

Grandma was much interested in the home-made goods, and when her companion pointed out many specimens of her own handiwork the older lady was delighted.

"Do tell! So you pieced and quilted that all by yourself," looking closely at the work, as beautiful in its way as lace work, "it's as nice as I ever done and mebbe nicer, and not many folks can quilt better'n I can. And so that rug is all made from old woolen rags drawn through the canvass with a hook; now who would think it?"

"Let me show you something else. Here is a knit spread, and this wool shawl that I don't mind telling you is for my mother-in-law."

"La, me! child, are you married?"

"Not exactly," blushing slightly, "but I expect to be this winter and that is why I am making these quilts and things. We are to live with my future husband's mother, who is a dear old lady, and I made those things for her. The farmhouse that is to be my home is a beautiful place all covered with roses and flowers everywhere. I do love flowers so much and shall be perfectly happy there."

Grandma sighed. If only Frank had seen this girl before he fell in love with that other. This one was evidently a country girl or how would she know so much about common things and piece quilts and braid rugs, etc. In the pantry department she had shown evidences of her skill also, and grandma easily persuaded herself that this girl possessed all the old-fashioned graces and accomplishments which would make her a most cherished daughter.

At the appointed hour grandpa came, and after promises to meet Thursday morning at the flower display they separated.

Grandma sung the praises of her new acquaintance, but the old gentleman was too full of his secret to heed much. He finally roused himself and asked her name.

"I clear forgot to ask her," and grandma looked a little foolish, "but she told me all about her going to get married and she made the beautifulest shawl out of wool for her husband's mother, who is such a fine old lady."

"Not half so fine as you are, I'll be bound," said grandpa stoutly, "you just wait until Thursday and we'll show her something to talk about," chuckling.

"Whatever do you mean?" but not one word more could she get.

Wednesday they rested, but Thursday found them on hand early, but when they finally reached the floral display the first thing they saw was the girl, who smiled a welcome at them, and began talking at once.

"Are your Dahlias here," asked grandma.

"Oh, yes! but they're nothing by the side of some that are here; why there is one display of nearly one hundred varieties; came in early this morning and the most beautiful I ever saw."

Grandpa pressed forward. "What would mother say when he told her." Just then the old lady saw John and said, "Why John, I didn't suppose you would care for the flowers. But la, me! one never can tell about these men, for there is father crowding right up among them and he never cares for the flowers at home, only Dahlias, of course."

"But it's the Dahlias he is looking at, and your Dahlias, too, mother; that's what is tickling him."

"My Dahlias! Why John!" she began, and then the whole story came out and the surprise was as great as even grandpa had hoped, until the young lady said: "My poor Dahlias haven't even a chance by the side of your beauties; I never saw such fine ones, so big and perfect. See, they are putting the blue ribbon on them. That's first premium, you know, and there goes the second premium to mine, the red ribbon."

"I hardly think it's just right," began grandma. "My dear, do you suppose they would put the blue ribbon on yours if I asked them to?"

"Oh, no! They couldn't do that, for your flowers are really very much finer than mine, and I am truly glad you got first premium. Why I have blue ribbons on ever so many things over in the other building."

"Mother," here broke in grandpa, "mebbe that young lady would come and eat dinner with us, and that would help square things," with a man's appreciation of a dinner.

"If you only would," said grandma, "but I don't even know what to call you."

"My name is Elizabeth Graham," readily responded the lady.

"Elizabeth Graham," excitedly repeated grandma. "Then you are my son Frank's sweetheart, and you are not ashamed of country folks?"

With a bewildered look the girl said, "I don't quite understand, but I am certainly Frank's sweetheart, and if you are his mother I shall be so happy, for I have been afraid to meet her, fearing I was not altogether worthy of her noble son." with the humility of a deep love. "but now, I love you already."

"So do I you, my dear, and I have been wanting you for my daughter ever since you first smiled at me."

Taking the hand of the girl in his, grandpa said, "You know, mother, I promised Frank to kiss his girl for him if I met her at the fair, but I never thought I would want to do it for myself," and despite the crowd grandpa kept his promise and always contended that though he didn't get any blue ribbons, he got something far better, and no doubt he was right.

PART XII.

REPORTS OF COUNTY AND DISTRICT AGRICULTURAL SOCIETIES.

ADAIR COUNTY.

W. W. Burrell.

Fair held at Greenfield, September 8, 9, 10 and 11, 1903.

On account of the unfavorable weather during the days of our fair the attendance was not as good as it would have been had the weather been more favorable, yet, financially, the fair was a success.

The exhibits of horses, cattle, hogs and sheep were the largest and finest ever shown on the grounds, and in the art, culinary, fruit and flower departments the exhibits were all that we could expect. Owing to the unfavorable season the exhibits in farm products were not as good as last year, yet they were a very creditable show and commanded $50 premiums.

Our hay and grass crop this year was exceptionally good, and with good weather at haying time it was cared for in the best of condition. A great deal of timothy was cut for seed, and it yielded from four to eleven bushels per acre. Fall feed is plentiful, and all kinds of stock are in good condition and bringing fair prices.

Oats were a light crop, yielding on an average of twenty bushels per acre, and owing to the wet season were colored some before being threshed.

Wheat was of an average yield and quality with former years.

We will raise more good corn than we did last year, but not so many bushels. Quite a number of wet spots will have none on, while the land well drained, and planted early, will produce good corn. Some late planted corn is yet in danger of frosts at this writing (October 5th), but with another week of good weather it will yield a fair number of bushels of good quality. The crop will be about 75 per cent of the average one.

Very little grain will be shipped from here this season, as the demand from feeders will consume nearly the entire crop.

Land is not selling as well as last year, but values are holding up, land being sold bringing from $45 to $85 per acre.

ADAMS COUNTY.

J. M. Devore.

Fair held at Corning, October 5, 6, 7 and 8, 1903, after a postponement of five weeks on account of wet weather. The exhibits were good in all departments, and especially in those of corn and apples, they being superior in quality and display of any previous exhibit ever made here.

Corn will yield below the average, on account of excessive rains and hailstorms.

Oats were of a fair yield, though somewhat damaged in shock by rain.

Wheat is not grown in this county to any great extent.

Hay was an abundant crop, and pasturage being good, all kinds of live stock are in excellent condition.

No hog cholera reported this year.

ALLAMAKEE.

Burt Hendrick.

Fair held at Waukon, September 1, 2, 3 and 4, 1903.

The fair was a very successful one from point of exhibits; the premiums were the largest paid in years, and with the improvements made on the ground the showing was of the best. The attendance was not up to the usual, owing to rain and threatening weather prevailing throughout the days of the fair.

Crops in this section were good. On the bottom lands floods destroyed the small grain, and set corn back, but on the uplands the corn was good. Small grain was a good average, both in yield and quality with former years. Thoroughbred stock of all kind is being raised extensively, and the exhibits in this department were the best ever made at our fair.

APPANOOSE.

John C. Ashby.

Appanoose county is sharing in the general prosperity of the county, and ranks well up among the first counties of the grand old State of Iowa.

The crops this year were up to the average, with the exception of corn, while on account of the late spring rains the acreage planted was not as large as usual. The corn on the uplands will make a very fair yield, while that on the low lands will not make as good a showing.

Hay was an abundant crop, and was put up without the rains damaging it to any great extent.

While there was not a very large acreage of wheat, the yield and quality were good.

Oats was a very good crop, both in quality and yield.

The millet crop was very large in acreage and is making a good, heavy yield.

Rye is not raised to any great extent in this section.

Buckwheat was sown by a few farmers in small patches this year, and was a very good crop.

The honey crop here is the best had for a number of years.

Prices are good, and as a rule the farmers are well pleased with the results of this season's work.

All stock is in good condition, as the fall pasture was never better. We have some heavy feeders in this county, and their pens are being filled with the best stock that can be obtained. Quite a number of thoroughbred cattle are fed in this locality, and bring top prices in the markets.

We have very large coal interests, which makes good local markets for farm and dairy products.

The person is very fortunate who owns land in Appanoose county, as he can gather a large crop each season, and in addition receive a nice income from the royalty on the coal underlying his land.

AUDUBON COUNTY.

O. B. Train.

Fair held at Audubon, September 1, 2, 3 and 4, 1903.

The fair was a very successful one, financially and otherwise. Exhibits were good in every department. The hog exhibit was the best ever seen in Audubon county, there being so many entries that the number of pens had to be doubled, and many were turned away on account of having applied too late for the society to accommodate them with space. The weather was fine every day, and the attendance was all that could be expected.

The association built a new amphitheater this year, and we now have as nice buildings and grounds as any association in western Iowa.

The farmers seem to have awakened to the importance and value of a "County Fair" in its true sense, and there are good grounds for believing that the exhibits in coming years will continue to grow both in quantity and quality.

The following is a summary of the crop and live stock conditions in Audubon county for the year of 1903:

Corn.—Yellow Dent, White Dent and mixed. Yield will average fifty bushels per acre of good grade. It would have averaged much better but for some being late planted, on account of early spring rains.

Oats.—Mostly white. Average yield twenty-five bushels, of poor quality. Were badly damaged by rain after cutting and while in stack.

Wheat.—Average yield about eight bushels per acre, and poor quality.

Rye.—Practically none raised.

Barley.—Spring. Average yield twenty-five bushels per acre, and of a fair quality.

Very little flax, buckwheat or sorghum raised in this county.

Potatoes.—Average yield forty bushels per acre, of good quality, and bringing $1 per bushel.

Timothy Hay.—Average yield two and one half tons per acre, with about one and one half tons per acre from second crop.

Prairie Hay.—Average yield one and one half tons per acre, of good quality.

Timothy Seed.—Average per acre four bushels, of good quality.

Horses.—Principal breeds, Norman, Clydesdale, English Shire and grades. There is a general improvement in horses of all kinds. A great many are bought here and shipped to other markets. Prices range high. Number assessed, 8,420. Actual value as assessed, $469,138. No disease.

Cattle.—Principal breeds, Durham, Hereford, Polled Angus, Jersey and grades. Durham preferred for beef; Jersey for dairy; steady improvement. Number assessed, 34,663; actual value as assessed, $874,118. Mostly marketed at Chicago. No disease to speak of.

Swine.—Breeds represented: Poland China, Berkshire, Chester White and Duroc Jersey. Poland China preferred, with Chester White and Duroc Jersey a close fight for second place. Supply good. Market, Chicago and Omaha. Practically free from disease. Number assessed, 39,197; value as assessed, $273,911.

Sheep.—Mostly Southdowns and Shropshire. General health good. Not much increase in industry. Numbers assessed, 1,671; actual value as assessed, $6,686.

The cultivated land is largely devoted to corn, hay and pasture, small grain not being very extensively raised. This is strictly a stock raising county, and can't be beat, in this respect, in western Iowa.

This year's crop was materially damaged by wet and cold weather, yet take it on the whole we have plenty to be thankful for. In August a destructive hailstorm passed over the west part of our county, which did a great amount of damage, but the soil is so productive and the farmers so thrifty that the loss will only be felt for a short time.

Small fruit was injured to some extent this year on account of the extremely wet weather. While the crop set well in the spring, it did not mature well and the cause is generally laid to the wet weather. This is also true with most of the large fruits, although the apple crop is quite good.

There is a steady improvement in the farms of Audubon county and very few farms can be bought for less than $60 per acre.

BENTON COUNTY.

Geo. D. McElroy.

Fair held at Vinton, September 16, 17 and 18, 1903.

The first and second days of the fair the weather was very unfavorable and roads almost impassable, but notwithstanding this the exhibits in the horse, swine and poultry departments were larger than last year. The floral display was very good, and all of the available space in the hall was taken.

The corn crop will average probably forty bushels to the acre, and that which was planted early and on high or well drained land is of a good quality.

The Vinton and Iowa canning companies put up over 6,000,000 cans of sweet corn this season. The farmers receive $5 per ton for the corn, besides having the fodder, which makes excellent feed.

BLACK HAWK COUNTY.

B. L. Manwell.

Fair held at La Porte City, September 22, 23, 24 and 25, 1903.

The fair was up to the standard in most of the departments, and a marked improvement was noticed in the quality of the stock exhibits. Good weather prevailed, and the fair was a financial success as well as otherwise.

The hay crop was good, and was put up in fine condition. Oats were a light yield both in quantity and quality. Corn is very uneven, but of a fair yield. The potato crop is not up to the average.

The creamery business is on a firm basis, the farmers' co-operative creamery handling this product to the general satisfaction of its members.

The canning company here (La Porte City) put up 1,500,000 cans of good quality sweet corn, the farmer receiving from $12 to $25 per acre for the corn, price being $5 per ton.

BOONE COUNTY.

F. W. Thomas.

Fair held at Ogden, September 8, 9, 10 and 11, 1903.

The fair was a great success, considering the fact that the season has been very backward, owing to the excessive rainfall. The rain on the second and last days of the fair had a tendency to keep the crowd away, but the third day was an exceptionally good one, and the gate receipts on a whole were very satisfactory.

All departments were well filled. The cattle and horse exhibits this year were the largest and finest the fair has seen for years. The hog exhibit was also very gratifying; Poland China and Chester Whites were the principal breeds shown.

The poultry exhibit was not so large as it has been in former years, but some very fine birds were on exhibition. Ten pens of sheep were on exhibition, although this is not a very extensive sheep raising community.

There is an increased interest manifested in the improvement of all kinds of live stock, especially horses and cattle.

The season has been wet, and as a result farming has been very backward. The acreage of corn, as well as other grains, is short, compared with former years.

The exceptionally fine weather in the latter part of the season has, however, been a great benefit in ripening the late corn, and the yield will be much better than at first expected. It will average about thirty-five bushels to the acre, and of a good quality. Oats averaged about twenty-five bushels to the acre, but of poor quality. Only a small crop of potatoes were raised this year.

The hay crop was the largest in years. There is a great number of cattle being fed here this year, notwithstanding the fact that last year was a very unprofitable one for feeders.

Land is changing hands here at from $75 to $100 per acre, depending largely on the location as to the distance from town.

The farmers did their share this year in making the fair the success we have reported, and although the speed department was not so completely filled as the association would have liked to have had it, the races were interesting.

The society has some very fine buildings on their grounds, and they are all in good repair. A fine stock barn was built this year, which adds very materially to that department.

The farmers' institute here is a very successful one, and is doing a great deal of good to the farmers.

BUCHANAN COUNTY.Y

C. W. Stiles.

Fair held at Independence, September 1, 2, 3 and 4, 1903.

Notwithstanding the fact that we have had two very wet seasons, and agriculture thereby being much retarded, we are most grateful, for Buchanan county has produced crops sufficient of all kinds to care for it during the coming year.

The ordinary number of hogs are being fed for market, but not as many cattle as usual.

The average yield of oats is variously estimated at from twenty to forty bushels per acre, weighing from twenty-six to twenty-nine pounds per measured bushel, and bringing on the market from twenty-six to twenty-eight cents.

Because of the unusual rains at planting time the acreage of corn is below the average, and the yield will be light; estimated at from twenty to thirty bushels per acre, and market at this writing (October 27th) offering forty-five cents for eighty pounds.

Potatoes are good where planted on high ground, and bring from thirty-five to forty cents per bushel.

Hay was an abundant crop, and was put up without being damaged by rains. Local market paying from $6 to $7 per ton.

BUENA VISTA COUNTY.

C. E. Cameron.

Fair held at Alta, August 18, 19, 20 and 21, 1903.

This, the association's seventeenth annual fair, was a success beyond our expectations, as we had four fine days—something unusual this year—as a great many fairs in this part of the State were declared off on account of rain. The attendance was the largest in the history of the society. Exhibits in all departments were large, and show great improvement, except in the farm and garden departments, which owing to the extreme wet weather which has prevailed throughout the season was not up to the usual standard. In the horticultural department we had one of the finest exhibits ever shown, especially in the apple display, which would have been a credit to any apple country. The apple crop this year was large, and the quality excellent. There were several cars of apples barreled and shipped out, something that was never done before, and we feel pretty proud of it, as they used to tell us that "Northwest Iowa could never raise fruit." If there is anyone that still doubts it, if they will attend the Buena Vista county fair we will dispel all doubts.

Horses and cattle are gradually being bred up to a good standard. Horses are scarce, owing to the many carloads that have been shipped out during the past few years.

Hogs are generally healthy, and there is a good crop of pigs. Corn will be seventy-five per cent of a crop, if frosts hold off until October 1st. Oats run from twenty-five to fifty bushels per acre, but light in weight. The hay crop was the largest in the history of the county, and of fine quality.

Land values range from $75 to $100 per acre.

CASS COUNTY.

S. W. W. Straight.

Owing to the destruction of a number of buildings on our grounds by wind we were compelled to declare our fair off for this year.

Crops of all kinds are below the average both in quantity and quality, owing to the unfavorable season. Much of the wheat and oats was spoiled in the shock, and all was more or less damaged by wet weather. There will be a fair crop of corn. There is a smaller acreage of potatoes than usual, and the yield will be light, many rotting in the ground. A hailstorm in July devastated a large strip of this section.

Fine cattle, hogs and horses are bred extensively in this section, and bring good prices.

Land values have not been affected by the bad season, farms selling from $75 to $125 per acre.

CEDAR COUNTY.

L. J. Rowell.

The Tipton Fair Association held its annual exhibition at that place on September 1, 2, 3, 4 and 5, 1903. The fair was a success in every respect, the weather being good, the attendance large, and entries in every department being well filled. Nearly all the different breeds of draft horses were represented, as were also the roadsters. The cattle exhibit, while good, was not as large as usual, though we offered good premiums. The showing in the sheep department was good, as was also that of swine, all the principal breeds being represented. The exhibit of farm products was fine. Floral hall as usual was filled to overflowing.

We had nothing but running races this year, which were well filled and gave satisfaction to all.

The Bauscher Carnival Company was on the ground during the fair, and this, together with what outside shows we had, filled the ground allotted for that purpose. We had some good free attractions; ball games daily, together with the races kept the crowd in good humor and busy.

The large attendance, and increase in exhibits, shows that an increased interest is being aroused in our fair.

The hay crop this year was very heavy and of good quality. Corn is good, excepting that which was planted late and in low places. The oat crop was good, but not much wheat is raised in this county. Barley was a good crop. The pastures are in fine condition.

Cedar county farm lands are ready sale, some selling as high as $130 per acre and the poorest cannot be had for less than $50.

CHICKASAW.

L. E. Eck.

The annual exhibition of the Big Four Fair Association of this county was held at Nashua, September 1, 2, 3, 4 and 5, 1903, and was a success financially and otherwise.

The oat and corn crop in this county will not exceed fifty per cent of the average one. Oats were considerably damaged by heavy rains during the harvesting period and while in the shock. Corn which was planted during the month of May matured and is of excellent quality, but most all corn planted subsequent to the above month is good only for fodder. Considerable buckwheat was raised and is of good quality. Barley was a total failure on account of too much rain. Rye was about an average crop.

CLAYTON COUNTY.

H. W. Scofield.

The Strawberry Point District Fair Association held its annual meeting at Strawberry Point on September 8, 9, 10 and 11, 1903. The weather was very unfavorable during the first days of the fair, and on that account the exhibits in some departments were lighter than usual. Tuesday morning the sun came out, and we had two good days. Taking everything into consideration the fair was a success.

There was very little wheat raised this year, and the quality was not as good as in former years. The oat crop was the poorest raised here in several years; the yield in bushels being about the average, but of very light weight.

Corn is very much better than last year, having been planted early enough so that frosts did no damage.

There was an unusual large crop of hay, and was put up in fairly good condition.

The potato crop was an average one in yield, but wet weather caused a good many to rot.

CLAYTON COUNTY.

Henry Luehsen, Jr.

The Clayton County Agricultural Society held its forty-third annual fair at National on September 1, 2, 3 and 4, 1903, and it was the greatest success in the history of the society. Between six and seven thousand people were in attendance on Tuesday, and every one present pronounced the program the best of the season. The policy of the association was liberal in every respect, premiums being increased in many of the departments, and a large amount of money spent for special attractions. Races were good, and well filled. The newspapers in all the surrounding towns were used liberally, and our fair was well advertised.

The Clayton county fair is becoming one of the best fairs in the State, as every year improvements are being made, premiums increased and the attendance is larger.

While our exhibits in some departments were not as large as they have been, we had an excellent program, so that visitors had no time to find fault with anything. The weather was favorable and the roads being fine enabled those living at a distance to remain until the day's program was finished.

Clayton county has enjoyed continuous prosperity, and there is a steady increase in price of real estate. Farmers are getting good prices for farm products and stock, and are getting to a profitable basis of farming.

Winter wheat was a fair crop, averaging about eighteen bushels per acre. There was no spring wheat sown to speak of. Oats are not very good and will average only about a half crop. Barley sown had a good yield per acre, and is of a good quality. There was a fair yield of rye, and quality is good. Corn prospects are good, and will average about eighty per cent of the usual crop. Very little buckwheat was raised, and no flax. Clover was a large crop, as was also timothy, being the largest had for many years.

Potatoes are of good quality and will average about ninety per cent of the usual crop.

Apples will average about a half crop, while grapes yielded about two thirds of the usual crop. Vegetables were up to the average.

CLAYTON COUNTY.

J. A. Kramer.

The Elkader Fair and Track Association held its annual fair in that city on August 25, 26, 27 and 28, 1903.

Corn in this section will average a full three fourths crop. Oats are very light, and will average about a half crop. Wheat is as good as usual and acreage sown will average that of former years.

Hay was an enormous crop, some localities reporting a record breaking yield.

Vegetables were abundant, excepting potatoes, which will average about a third of a crop, as many of them rotted in the ground and some after being taken out.

Grapes were abundant, but not ripening in season and were not of a very good quality. Apples are very scarce and of poor quality.

CLINTON COUNTY.

J. B. Ahrens.

The annual meeting of the Clinton District Agricultural, Fine Stock and Fair Association was held at Lyons, September 8, 9, 10, 11 and 12, 1903.

Rain at the beginning of the fair marred the attendance to some extent, and caused the carrying over of the fair until Saturday, September 12.

The exhibit of horses was the largest in the history of the association, as was also that of swine. The exhibits in other departments were well up to the average.

Corn in this locality is good, the frost doing very little damage. The acreage is about the average, and the yield will be better than first expected. The small grain, owing to the excessive rains this season, is not up to the average and is of light weight.

Farmers are awakening and beginning to take an interest in getting a better breed of cattle and improving their herds.

Land in this county is selling at from $80 to $110 per acre, and some as high as $140 per acre.

CLINTON COUNTY.

L. D. Winne.

Fair held at DeWitt, October 15, 16, 17 and 18, 1903.

All departments were well filled, and although the weather was very unfavorable, being cold and wet, the attendance was good and the fair was a success.

Crops were not as good as last year, but there is plenty for home consumption, and some to ship out.

DALLAS COUNTY.

Josiah Petty.

Corn in this section is very slow in maturing, a large per cent being yet in roasting ears, owing to the exceptionally wet season, and land in this vicinity being flat and of deep soil. Some of the land here was too wet to plant at all.

Oats, with a few exceptions, are of a poor quality, yielding from twenty to thirty bushels per acre, and light weight, ranging from eighteen to twenty pounds to the measured bushel. The quality of wheat is good, and will average fifteen bushels per acre.

Hay was an exceptionally large crop, yielding from one to two tons per acre, and being fortunate in having good weather at cutting time was well cured, and that which was stored in barns and sheds is in good condition, but that in stack is spoiling owing to the rains coming on before thoroughly settled.

Potatoes are of a very poor grade and yield, there not being enough raised to supply home consumption.

Cattle are in fine shape, as the pasturage was never better. Hogs are doing well, and no cholera reported.

DALLAS COUNTY.

H. H. Crenshaw.

Fair held at Adel, September 9, 10 and 11, 1903.

The condition of agriculture is not very flattering. While it is true that small grain made a fair yield, most of which has been threshed at this writing (September 9th), the fact remains that the outlook for corn is not good. The early planted corn will yield a good crop, but much of our corn, perhaps one half, is of late planting, and it is hardly probable that it will mature. The potatoes and other garden vegetables are far below the average, both in quality and quantity.

Some hog cholera has appeared, and our farmers, especially the renters, are discouraged.

Much of our land is changing hands at from $80 to $115 per acre, which necessitates raising the rent, and many of our best renters are thinking seriously of moving to some other place where they can acquire cheap land. While we of Dallas county claim to live in the best county in the State, we cannot deny that there is much low land here, which will have to be tiled before it will be useful in a wet year like the present one.

The farmers are taking more interest in the "county fair" and have began to realize that they can profit as much by it as the local merchant or the wandering popcorn vender. We feel that our fair is entering an era of prosperity. The town of Adel has voted a tax with which to purchase the grounds, and new buildings will be erected next year. More premiums will also be added.

DAVIS COUNTY.

J. C. Bouhard.

Fair held at Bloomfield, September 16, 17, 18 and 19, 1903, after postponement of one day on account of rain. The fair was a success financially and otherwise.

The exhibits in most classes were about the average, with the exception of the swine department, which was larger than at any previous fair held here. All expenses and premiums were paid in full. We erected a new cattle barn this year at a cost of $600, dimensions of which is 112 feet by 32 feet, and with a capacity for fifty cattle, which was a much needed improvement.

The acreage of corn and oats was smaller than for a number of years, owing to wet weather preventing seeding. Many farmers did not get all their land planted, especially that lying in the bottoms. Considerable corn was planted very late, and the season being cool and unfavorable for its growth a great quantity will not mature, and will be unsalable.

Oats were about half the average yield, and are very light in weight.

The hay crop was the heaviest had for years, of good quality and well cured.

DELAWARE COUNTY.

James Bishop.

Fair held at Manchester, September 2, 3 and 4, 1903.

The condition of agriculture in this county compared with former years is a fair average. The continued wet weather in the spring retarded planting in the low lands, and corn in these localities is very uneven. On the uplands, where the soil is a little sandy, the corn is maturing fast, and will be a good crop, while that on the low lands is poor and will need the whole of September in which to mature. Oats and barley are generally poor, in both yield and weight. Rye is a fair average with former years. Not much wheat is raised in this county. Vegetables and fruit were a good crop.

Dairying is in a flourishing condition, the yield of milk being in excess of all former years, owing to the excellent pasturage. Fair prices are received for all dairy products. New milch cows are in demand, and bring prices ranging from $40 upward.

Stock of all kinds are in excellent condition, and with rough feed in abundance the average farmer has nothing to fear, even if he does have some soft corn.

The breeding of fine horses is on the increase, and many imported draft and coach horses are being brought in.

DES MOINES COUNTY.

C. C. Fowler.

The annual exhibition of the Burlington District Agricultural Society was held in that place September 8, 9, 10 and 11, 1903, and was a success in every respect. The live stock exhibit was the largest and best made in many years, a number of the animals exhibited carrying ribbons awarded them at the Iowa State fair of 1903.

The following is a summary of the crop and live stock conditions in this county for the year of 1903:

Corn: White and Yellow Dent are the principal varieties raised. The yield will average fifty bushels per acre, and is of fair quality. There was an increase, of perhaps 10 per cent, in the acreage planted, but the quantity will not reach the average, owing to that which was planted on the bottom lands along the Mississippi river being drowned out.

Wheat: An average yield of about twelve bushels per acre, and of fine quality, all of which will be used for home consumption.

Oats: A fine crop, of good quality, and bringing on the market at this writing (October 15th) forty cents per bushel. The principal varieties raised are White Russian and Welcome. There was about fifteen per cent increase in acreage over former years.

Rye, barley, buckwheat and flax when planted in this county are used only for home use, and as a general thing did well this year.

Potatoes: A fair crop, averaging seventy bushels per acre. Early Rose, Early Ohio and Beauty of Hebron are the favorite varieties.

Timothy hay was a fine crop, averaging one and a half tons per acre, and bringing on the market $8 per ton. Considerable is being sold for shipment. There was also a good crop of clover hay, which will average two tons per acre. Prairie hay was a short crop, on account of land on which it is raised lying in the bottoms, most of which was flooded.

There is a demand for good heavy draft and carriage horses, and many are being brought in. Farmers see that neither electricity, or any other power, can take away the pleasure offered by a good horse, to say nothing of the fact that he is always ready and willing to do the work asked of him, if well treated.

Shorthorn, Herefords and Polls are the principal breeds of cattle raised, and are in good demand.

Poland China and Chester Whites are the favorite breeds of swine, and there is a tendency among farmers to improve their herds, recognizing that it is profitable.

Sheep have received very little attention, owing to losses caused by dogs.

The season, while wet, has been a good one, owing to our having but little snow last winter, leaving the ground in a condition that it could absorb large quantities of water. While the crops were late in being planted, owing to heavy rains in the early spring, they were well out of harm's way when the first frosts appeared.

Fruit did splendidly, but farmers have been getting such good prices for corn and cattle that orchards have been neglected, trees dying out without others being planted to take their place, and owing to this fact the crop was small as compared to former years.

Among the many inducements for farmers in locating here are good roads and safe bridges, with land selling at from $60 to $100 per acre, which is an assurance that they will get a good interest on their money and time invested; also that the county is singularly free from disease among stock, or damage from winds.

FAYETTE COUNTY.

H. P. Hancock.

Fair held at West Union, September 1, 2, 3 and 4, 1903.

The fair was a very successful one in every way, and the most profitable one in its history. Grounds and buildings were in excellent condition, and everyone was well pleased with the new amphitheater and vegetable hall.

The general condition of agriculture has been fair.

There was about the usual acreage of corn planted, but will not yield more than sixty-five per cent of the average crop. The quality is good. Very little damage was done by early frosts, and that only in low lying land.

The oat crop was very light in yield and poor in quality.

There was not a very large acreage of wheat sown, but the yield was fair.

Barley and rye were about the average in acreage sown and yielded well, and of a good quality.

There was an unusually large crop of hay, which was put up in the best of condition.

Potatoes did not average more than one third of the usual crop, and are of poor quality, rotting badly.

There is a tendency among farmers toward improving their breed of horses, and those sold are bringing good prices.

Cattle are being raised extensively, and are mostly of the better grade, there being many fine breed herds of Shorthorn, Angus, Galloways and Herefords.

Hogs are in excellent condition, and preference is for Poland China and Chester Whites.

There are very few sheep being raised here.

Poultry is one of the most profitable industries of the average farmer in this county.

Dairying is very extensive and was exceptionally profitable this year, owing to the excellent pasturage.

Of late years the raising of tobacco has been experimented in by a few and has proven very successful.

FRANKLIN COUNTY.

J. W. Cummings.

Fair held at Hampton, September 8, 9, 10 and 11, 1903.

The fair was a success, both financially and otherwise.

Owing to the exceptionally wet season farm products, with the exception of hay, which was abundant and put up in fair condition, was not up to the average, either in yield or quality. Following is the percentage of yield of the staple products as compared with former years: Wheat, none raised; oats, 50 per cent; corn, 80 per cent; potatoes, 60 per cent; apples, 45 per cent; millet, 90 per cent.

GRUNDY COUNTY.

J. W. Pepperman.

The annual meeting of the Gundy County Agricultural Society was held in Grundy Center, September 8, 9 and 10, 1903, and was a very successful fair. All departments were well filled, with the exception of the division for cattle, which was not as large as usual.

The attendance was very good considering the rainy weather, but was not as large as it would have been had the weather been good. Notwithstanding the unfavorable weather conditions we were able to pay all premiums in full, and are in good condition for a successful fair another season.

The oat crop was very light, yielding an average of twenty-five bushels per acre, but was of the usual quality, testing twenty-three pounds to the bushel.

Some fields of corn are exceptionally good, and will yield from sixty to eighty bushels per acre, while others are poor and will not yield over fifteen to twenty-five bushels per acre. It will average about thirty-five bushels per acre.

The hay crop was above the average, both in quantity and quality.

Potatoes were a good crop, some yielding as high as two hundred bushels per acre, and will average one hundred bushels per acre.

GUTHRIE COUNTY.

A. H. Grisell.

Fair held at Guthrie Center, September 8, 9, 10 and 11, 1903.

Although unfavorable weather prevailed, there being but two days of the week that it did not rain, the receipts were sufficient to pay all expenses and premiums in full, and with a small balance over.

The season was an unusually wet one, and while it was conducive to the growth of oats, wheat and hay, which gave promise of an abundant harvest, excessive rains ruined a large part before it could be safely cared for. There is an abundance of rough feed to carry stock through the winter.

About 60 per cent of the corn matured, but will not yield an average of more than thirty bushels per acre. No killing frost has visited this county up to date of this writing (October 14th).

HANCOCK COUNTY.

John S. Fisk.

Fair held at Britt, September 15, 16 and 17, 1903.

The attendance was very light, owing to rain and cold threatening weather prevailing throughout the fair.

The live stock exhibit was smaller than usual, owing to the heavy rains making the roads almost impassable and preventing bringing in stock from the country.

Exhibits in vegetables and grain were especially good, and that of fruit was far above the average.

Favorable weather the last week in September put the corn crop in better condition than anticipated, but the yield and quality will not be up to the average.

Oats did very well on high well drained land, but on the low lying land did not average more than ten bushels per acre.

There was a good yield of potatoes, and were generally of a good quality, with but few reports of rotting.

Pasturage and hay being abundant made dairying a very profitable industry this season.

Land values are unchanged in this locality, farms selling at from $50 to $80 per acre, but very few transfers.

HARDIN COUNTY.

C. E. Greefe.

The thirty-third annual exhibition of the Hardin County Agricultural Society was held at Eldora, September 1, 2, 3 and 4, 1903. The weather was as favorable for a good fair week as any person could ask for. Lists of entries, through the special effort of the secretary, were filed for the record fully six weeks before the date of the fair. This feature made the work of entering easy for one person, although our total entries were over twenty-two hundred, which was fully 50 per cent more in numbers than the books of the society show as ever having been made before. While this feature was gratifying, its one drawback lies in the fact that the expense was also greatly increased in the payment of the added premiums on the proportionally larger classes filled. The display of cattle generally was of a high class, and our swine, in numbers, far exceeded our former pen capacity, and in quality were never better. Our poultry houses were very well filled with many varieties. Farm products, owing to the unusually wet season, were not especially large. Fruits of the varieties grown in Iowa were shown in abundance and were of very good quality. Our special corn exhibit proved a failure, owing largely to the fact discovered too late that this feature must generally be considered and treated as a December or January show, as not many times in a score of years could it possibly be a practical exhibition so early in the season.

Our receipts were larger than ever before, attendance numbering about six thousand persons on Wednesday, thirteen thousand on Thursday and about seven thousand on Friday. Our privileges were well sold and free attractions were of a pleasing kind, and the entire fair was of a clean moral nature and no complaint was heard.

Our speed program was well filled, which was no doubt due to the unusually large purses offered. All races were started and were the attractions to which we concluded we owed our big crowds.

The corn crop at present in this section is far from matured, in fact at this writing many of the fields show the ears as still growing. It is an open question whether or not 50 per cent of the crop can possibly ripen and be merchantable corn.

Our oat crop proved light and was a disappointment both in quantity and quality when the threshing began.

The hay crop was above the average and generally speaking was cut and put up in good haying weather.

Lands are held at about the prices asked last year, although not many sales are being made just now.

The soil of our lands is of good quality, and being underlaid with a gravel subsoil is soon in shape to cultivate after either a wet or a dry time. In fact in exceeding dry times a moisture seems to come up from below, making the plowed fields soft and mellow.

HENRY COUNTY.

O. N. Knight.

The Henry County Agriculture Association held its sixth annual exhibition at Mount Pleasant, August 12, 13 and 14, 1903, and it was a grand success in every way. We were favored with ideal weather, and the attendance on every day exceeded that of any former years. Our grounds were free from games of chance, and no disreputable shows or booths were permitted.

All exhibits were attractive, and every class was well filled. Exhibits in the art hall were the best made for years, and the kitchen and pantry department was up to its usual high standard.

One very interesting feature of our fair is the "School Exhibit." Our county superintendent has taken an active interest in ths work, and an interest is manifest in every school district in the county. The exhibits in this department were very attractive, showing merit in many departments of our district schools, and quite a number of the pieces exhibited will be before the meeting of the State Teachers' Association held in Des Moines, to be selected from for exhibit at the Louisiana Purchase Expositon.

Our agricultural exhibit was light, owing to the early date of our fair, but early vegetables and early small grain were well and numerously displayed. There was much interest manifest in the horse department, and competition was close in all classes. Our cattle barns were well filled, and the following herds were especially noteworthy: W. Beckwith, Herefords; W. B. Seeley, Aberdeen Angus, both of Mount Pleasant; Elmer Seaman, Houghton, Iowa, Durhams, and C. D. McPherson, Fairfield, Iowa, Galloways. They were all fine specimens of their respective breeds and a credit to any show ring.

The swine exhibit was much larger than ever before, and additional pens had to be built to accommodate them.

The sheep pens were well filled with the best specimens of long wool and mutton sheep.

Agricultural conditions are not up to the average. The hay crop was an unusually large one, and having ideal weather at cutting time, it was well taken care of. Oats had a very light yield, not averaging more than a third of the usual crop, and very poorly filled. There was a small acreage of wheat sown, but yield and quality were fairly good. Rye was a good crop, and a profitable one.

Corn is our principal crop, and while it is hardly an average with former years, it is much better than we could reasonably expect, as fully 50 per cent was planted very late in the season, but frosts holding off has given it an opportunity to mature.

The fruit crop was generally light. Cherries were scarce, and apples were not half the average crop, and are of an inferior quality.

Potatoes are very scarce, the crop not being enough to supply local market.

Fall rains have been plentiful, and pasturage is good. On the whole we have plenty, and the county is in a prosperous condition.

HENRY COUNTY.

J. L. Roderick.

Annual exhibition of the Eastern Iowa District Agricultural Society held at Winfield, August 18, 19, 20 and 21, 1903.

The meeting was a success in every way, the weather being almost perfect, and the attendance breaking all previous records. Entries in all departments were above the average.

Corn will be a very good crop, considering the extremely wet season. The yield will be about two thirds of the average one.

Oats were some better, both in quality and yield, than last year.

There was an unusually large crop of hay, and pasturage is abundant.

Farm lands are selling at from $50 to $125 per acre.

IOWA COUNTY.

F. O. Harrington.

Fair held at Williamsburg, September 8 to 12, 1903, inclusive.

On the first day of the fair the weather was threatening, and roads were in bad condition, with entries coming in slowly. Then followed about thirty-six hours of incessant rain, and only fit weather for web-footed bipeds to be abroad. Because of these conditions our entry books were held open until 10 o'clock of the third day of the fair. We decided this year to hold but a three days' session of the fair, but owing to the unfavorable weather during the original dates decided to extend it for two days, and the latter two days, while threatening weather prevailed, brought out a fairly good attendance.

Naturally owing to such weather conditions our fair financially considered was not a decided success, yet we paid all premiums in full, and taking everything into consideration did reasonably well.

The showing of horses was not as good as we have sometimes had, yet was fairly good, and there were represented various breeds and individuals of decided merit. Our farmers find that it is profitable to raise a good breed of horses, and are using good judgment in the breeding of them.

This section is well stocked with thoroughbred cattle, there being several fine herds of Shorthorns, Aberdeen Angus and Jerseys. Breeders in general use only thoroughbred males, and the bulk of the cattle here are well graded up.

Swine, of which large numbers are raised in this county, made a fine showing, and were of superior quality; Poland China, Duroc Jersey and Chester White were the breeds most in evidence.

The sheep exhibit was good, considering that but a small number are raised here. The breeds exhibited were Shropshire and Lincoln.

Oats had a fairly good yield, though the quality was not of the best, owing to wet weather damaging them considerably while in shock and stack. Comparatively no wheat is raised here.

The hay crop was an exceptionally good one, the supply being more than adequate for home demands, and considerable is being baled and shipped to other markets. Considerable timothy and clover were cut for seed and yielded fairly well.

Rye is not grown here so much as formerly, but that raised was a fair crop.

Potatoes were very light in yield, but of a good quality. It is doubtful whether the supply is enough for home consumption, and is quite probable that at least much of the seed for next year will have to be shipped in.

Corn lacks greatly in uniformity, and will yield from sixty bushels per acre in some fields to but very few in others. Some of it is not yet out of the milky stage (September 28th) and will be valuable only as fodder. Husking will be greatly delayed this season, owing to slow ripening and drying, and even in the good fields of corn there are many belated ears, which are likely to do harm in crib if not sorted out. Much of this has been produced on sucker stalks, for the process of suckering existed to an unusual degree this season. The corn which was planted on low lying land, and not properly drained, was mostly all drowned out.

Millet sown was a very satisfactory crop, although some trouble was experienced in curing, owing to unfavorable weather conditions.

A number of silos are in operation in this county, and this method of utilizing the corn crop is proving very satisfactory and is greatly increasing in popularity.

JACKSON COUNTY.

B. D. Ely.

Fair held at Maquoketa, September 1, 2, 3 and 4, 1903.

The fair was the most successful one in the history of the society, both from a financial and exhibition point of view, the attendance being large and exhibits in all departments well filled. The attractions gave satisfaction, and the evening concerts were well attended.

The hay crop was the largest had for a number of years. Small grain was of the average yield and quality. Corn is not very promising, but favorable weather without early frosts will improve its condition in a great measure.

As usual the grade of cattle and sheep is improving each year, as is also that of swine.

Horses are abundant, and of a grade that sell well on the market.

There is more attention being paid to poultry breeding than in former years, the poultry association having awakened an interest in the business, and farmers recognizing that it is a profitable industry.

JASPER COUNTY.

C. W. Campbell.

Fair held at Newton, September 7, 8, 9 and 10, 1903.

The fair was not a very successful one financially, owing to rain and unfavorable weather prevailing throughout the week, yet the society paid all bills in full, and eighty per cent of the premiums.

Generally speaking the season was backward, being cool with excessive rains. There is not much winter wheat raised, but the yield and quality were good. Spring wheat yielded well, and was of a fair quality, although damaged some by rust.

Oats were below the average both in yield and quality, being light weight and damaged to a great extent by rust. Barley sown yielded fairly well though damaged some by rains.

A favorable fall has done much for the corn crop, as the cool wet summer retarded its growth to a great extent, also owing to excessive early spring rains a great deal of it was late in being planted.

There was an immense crop of hay, some yielding as high as four tons per acre, and was generally put up in good condition. Pasturage was exceptionally good.

Early potatoes were of a fair yield and quality, while late potatoes had a poor yield but of a fair quality.

Apples did fairly well. There was a good yield of peaches, but were damaged some by rains. Grapes were exceptionally good, both in quality and yield. Strawberries and small fruit were generally good.

Farmers are prosperous and generally seem contented with the season's crop.

JEFFERSON COUNTY.

L. J. Marcy.

Fair held at Fairfield, September 8, 9 and 10, 1903.

The season in this section was very much retarded, owing to snows leaving the ground in a very wet condition, and a cool and cloudy spring preventing it from drying out quickly, thereby delaying planting from three to four weeks.

The acreage of oats and barley sown was less than usual, owing to the ground not being in condition at planting time. The yield was from ten to twenty bushels per acre, and of poor quality. Oats did not weigh on an average of more than twenty-four pounds to the measured bushel.

Not over one third of the corn was planted in seasonable time, and that only on the hilly and rolling ground. This corn will mature and will yield from twenty-five to forty-five bushels per acre, while the corn on the low lying and level land will not yield more than a third of a crop. There is considerable old corn in this county.

There was an unusually large crop of hay, of good quality, and was put up in the best of condition. Not as much timothy cut for seed as usual, but was of a good quality and yield. More than the average acreage of clover was cut for seed.

Pasturage has been abundant all season, and live stock have done exceptionally well.

Potatoes and other vegetables were a poor crop both in quality and yield, there not being enough raised for home consumption.

Fruit, with the exception of plums, had a very light yield and were of poor quality.

Farms are well stocked with cattle and swine, and there is an increase in the breeding of horses, owing to matured horses being very scarce.

JOHNSON COUNTY.

J. C. Leasure.

Fair held at Iowa City, September 1, 2, 3 and 4, 1903.

Corn which was planted early and on high land is of a good quality, and will be of the average yield, while that planted late and on the low lands is very uneven, and of poor quality.

The oat crop while not an average yield is of a good quality.

Potatoes were of a light yield, being small in size, but quality is good.

There is an abundant amount of rough feed, including hay, fodder and pasturage.

There is a noticeable improvement in the grade of horses since last year, and the younger class show good breeding, and have careful attention by the farmers.

Cattle are in excellent condition and quality is being improved each year.

More swine are being raised than last year, and the quality is improving.

Sheep are about the average, both in numbers raised and grade.

JONES COUNTY.

W. G. Eeilers.

The annual exhibition of the Jones County Agricultural Society was held at Monticello, September 15, 16, 17 and 18, 1903.

The fair was a success financially and otherwise, and although rainy weather prevailed throughout the week the gate receipts were the largest in the history of the society.

The cattle and horse barns were well filled, but the swine and sheep departments were not as large a showing as in former years.

The exhibits in vegetables and fancy work were especially attractive.

Agricultural conditions in this county are good. Small grain was of good quality, and the yield was above the average. Corn will have a good yield, except on the low lands, where it is uneven on account of heavy rains preventing early planting.

The hay crop was an exceptionally good one, and was generally harvested in good condition.

Farmers here are very successful, being mostly of German nationality and thrifty.

Farm lands are selling at from $65 to $135 per acre.

JONES COUNTY.

E. R. Moore.

The Anamosa District Fair Association held its annual meeting August 24, 25, 26, 27 and 28, 1903.

The fair was the greatest success in the history of the association from every point of view, excepting that of attendance, which was not as large as it would have been had the weather been favorable, it having rained every day of the fair. The attractions were numerous and varied, and were given from two platforms. Also two games of base ball were played each day on the grounds.

Agricultural conditions are good in this county. Corn, except on the low lands is a good crop. The hay crop was an exceptionally large one, a number of meadows yielding two crops.

KEOKUK COUNTY.

Geo. A. Poff.

Fair held at What Cheer, September 22 to 25, 1903.

The fair was the most successful one in the history of the society, financially and otherwise.

The acreage and yield of corn in this county is about the average, and quality is good. Small grain was an average crop compared with former years. Hay was an exceptionally large crop.

There is a noticeable improvement in the breeding of all kinds of stock.

Land is selling at from $60 to $100 per acre.

KOSSUTH COUNTY.

T. H. Wadsworth.

Fair held at Algona, September 8, 9, 10 and 11, 1903.

The fair was a success, both from point of exhibit and financially.

Owing to excessive rains during the season, small grain grew a very rank growth of straw, and rusted badly. The hay crop was an exceptionally large one, and of good quality.

Corn, at this writing (September 25th), is in good shape, and the prospects are for a good crop, both in yield and quality. A great deal of corn is being cut for fodder.

LEE COUNTY.

E. P. Armknecht.

Fair held at Donnellson, August 26, 27 and 28, 1903.

Rain all of Wednesday night and Thursday of the fair made it very discouraging, but Friday was a fair day and the admissions on that day together with the receipts from other departments were nearly enough to pay expenses and premiums. We had several meritorious free attractions on the grounds this year, and find that people want this kind of entertainment, along with good horse racing at a "County Fair."

The acreage of oats sown was light, on account of unfavorable weather at seeding time. The yield was from seven to thirty-five bushels per acre, and in quality was light. Fall wheat and rye was a good crop, both in quality and yield.

There was an exceptionally large crop of hay, which was put up in good condition. Timothy seed yielded well, and quality fair. Clover seed was excellent in quality and yield.

At this writing (September 10th) early corn is matured, and with favorable conditions until October 1st we will be able to realize over fifty per cent of the exceptionally large yield of 1902.

Farmers are each year giving more attention to the raising of stock, and an interest is manifest for producing better breeds, and the improvement in cattle, sheep and swine is quite noticeable.

Horses are in demand, and the better class are bringing good prices.

There is a marked advance in price of farm lands here, good farms bringing from $60 to $80 per acre.

LINN COUNTY.

E. E. Henderson.

Fair held at Central City, September 22, 23, 24 and 25, 1903.

The fair was one of the best ever held at this place, and was pronounced by all who visited it, to be one of the cleanest fairs they ever attended. The management turned down several hundred dollars offered by privilege men that were making the rounds of other fairs.

The live stock exhibit was good, and pronounced by many to be the best ever seen at this fair. The amount of premiums paid were never exceeded but by one fair since the organization of the society. The art hall was well filled and decorated, and contained no exhibits of merchants or business firms, being filled only with the handiwork of the people.

A cabin such as was used in pioneer days was built, and contained an old time spinning wheel shown in operation, together wit hother articles suggesting and illustrating pioneer times. Great interest was manifested by old settlers in this cabin and its exhibits.

The attendance was the best had for three years, but was not up to the expectations of the management. Nearly eight hundred dollars were spent in improvements, in the way of two new large swine barns, planting of shade trees and ditching.

The extremely wet season affected the crops to some extent, but they are considerably better than last year, and especially is this true of the quality of corn. Oats were of a fair yield, although they are somewhat light in weight.

There were potatoes enough raised for home consumption, but are not of as good quality as usual on account of wet weather.

The hay crop was an exceptionally large one, but was not put up in the best of condition owing to rains.

Live stock is especially well favored in this county, both in quality and quantity. Considerable more feed-stuffs are shipped in than out, which speaks well for the live stock industry. Very little land is being sold in this county.

LINN COUNTY.

E. H. Knickerbocker.

The annual meeting of the Prairie Valley Fair Association was held at Fairfax, September 12, 13 and 14, 1903.

On account of rainy weather prevailing the attendance was not quite up to the average. The exhibits were much better than we expected, owing to our early dates of holding the fair.

Crop conditions of this county are fine, considering the extremely wet season. Corn will average about forty bushels per acre. and is of fair quality. Oats are somewhat colored, and had an average yield of thirty-eight bushels per acre. Wheat and rye yielded on an average of twenty-five bushels per acre. Barley is not raised to any great extent in this county. There was a large crop of hay. Vegetables were of an average crop, while fruits of all kinds yielded poorly, but were of fair quality.

There is a noticeable interest being taken in the raising of thoroughbred stock.

Farm lands are selling at from $60 to $125 per acre.

LOUISA COUNTY.

Ed Hicklin.

Fair held at Wapello, September 29 and 30 and October 1 and 2, 1903.

The weather conditions this year have been very unfavorable for the greater part of the land in this county, there being an excess of rainfall. All of the lower lands were drowned out, and causing late planting on the uplands, favoring the more sandy soil.

Corn is not more than fifty per cent of a full crop in yield, and there will be considerable soft corn to be placed on the market. There was not as large an acreage as usual, and the quality, taken on a whole, is not up to the average.

The oat crop was nearly a total failure, and those which matured were light and chaffy.

The rye crop was but little better than fifty per cent of the average one. However, there is not much planted in this county.

Hay yielded an exceptionally large crop, and was put up in good condition.

The weather has been favorable for fall seeding, and fall wheat and rye look well.

Corn is nearly all gathered at this writing (December 1st).

The fruit crop was a very good one, both in quality and quantity.

Farm Mechanics Students, drawing barn and other building plans.
I. S. C.

Students in Farm Mechanics, studying the traction engine.
I. S. C.

LOUISA COUNTY.

R. S. Johnston.

Fair held at Columbus Junction, September 1, 2, 3 and 4, 1903.

This was our twelfth annual fair, and as usual was a very successful one in every respect, all exhibits being up to their usual high standard. We were favored with dry, pleasant weather throughout the days of the fair, and the attendance was exceptionally large.

The fruit department was larger than ever before, which shows that an interest is being taken in this culture.

Our fair management has adopted the single judge system in nearly every department, and it gives excellent satisfaction.

Horses have been very high in price for the past year, with a steady increase and good demand. The bulk of the horses raised are draft, but there is a demand for all sound and showy animals. Prices range from $100 to $200.

The prevailing breeds of cattle raised in this county are, Shorthorn, Herefords and Angus, there being but few Jerseys. Breeding cattle are selling for a much lower price than formerly, and this is also true of feeders which are shipped in, they bringing $1 less per hundred than last year. There are not as many cattle being fed for market as was last year.

While there is a goodly number of breeders of pure bred swine in this vicinity, it is in a quiet way, there being few shipped in at fancy prices.

There are very few sheep owned or raised in this vicinity.

The acreage of corn planted is up to the average of former years, and while some fields will not have an average yield owing to the late planting caused by excessive early rains, the crop in general will be good both in qualty and yield.

Oats are of a fair quality, but light in weight and yield.

HUMBOLDT COUNTY.

F. C. Loverein.

The forty-sixth annual fair of the Humboldt County Agricultural Society was held at Humboldt, September 1, 2 and 3, 1903, and was a success in every way, the attendance on the second day reaching nearly five thousand people.

The quality of the farm produce exhibited surprised everyone, considering the exceedingly wet season. Corn was well filled and large. Oats and other small grain rather light. Garden vegetables fairly good. Fruit displayed was abundant in quantity and excellent in quality, and it is evident that fruit growers have learned that many varieties of apples can be raised with the very best success in this county. Peaches were also shown, which looked very plump and nice. Hope Cottage was well filled with beautiful plants of man species.

Horses shown at fair indicate that our farmers are breeding almost exclusively for the heavy draft.

Cattle shown included Durham, Red and Black Polled, Holstein and Swiss. The Swiss are very heavy beef cattle, and have only been raised in this county for the past few years. The Black Polled are very popular, and thought by many to excel the Shorthorn for beef purposes.

The exhibit of swine was very good.

Sheep raising is receiving more attention of late years, and our exhibit in that line was extra good.

Angora goats are bred by a number of our farmers with marked success. They are very profitable for farmers living along the river and having timber and brush to clean up.

Poultry raising is one of the most profitable industries of this county and our exhibit in that department was large and of the best quality.

The quality and quantity of corn in this county will depend upon the length of time the frost holds off; if none comes before the first of September we will have an average yield and quality. but earlier frosts would prevent most of it from maturing. However, as nearly all corn raised in this county is used for home consumption, soft corn would not cause so great a loss as in localities where it is sold for shipment.

Land in Humboldt county sells from $55 to $100 per acre.

The necessity for more scientific farming is impressing itself more and more upon the minds of the farmers of this county. The farmer who has his land in proper condition and drained will do well this year, while the man who was behind with his work, had all his plowing to do in the spring, and planted his crop late, will receive small returns for his labor.

The question of drainage is receiving a great deal of attention and there has been thousands of dollars spent in tiling this season.

LUCAS COUNTY.

Chas. R. Kirk.

Fair held at Chariton, September 18 and 19, 1903, after a postponement of three days on account of heavy rains.

The exhibits were light in all departments with the exception of horses and swine which had a splendid exhibit.

Horses in this county are about the average in quality of grade draft horses, and farmers are obtaining top prices for everything good regardless of age.

Cattle of pure blood are bred by many farmers in this vicinity, Shorthorn and Herefords being the preferred breeds.

There is a steady advance in the breeding of pure bred swine.

We have some very large breeders of sheep, but farmers as a rule raise none at all.

Very little wheat was sown here and yield was light.

Oats were heavy but were damaged to a great extent in shock before threshing. Yielded on an average of thirty bushels per acre.

Corn will average thirty-five bushels per acre of fair quality.

Potatoes were a light crop, while that of fruit was an average one.

MITCHELL COUNTY.

J. A. Cutler.

Fair held at Osage, ——— 1903.

On account of the rainy weather which prevailed throughout the days of our fair, the exhibit of stock was not quite as large as it would have been had the weather been pleasant. However, there was a fine exhibit of registered, or eligible to registry, stock. One of the very attractive and interesting features of our fair this year was the educational department, premiums amounting to $105.75 having been paid in this department.

Crops, on the whole, are not an average with former years.

Corn is a good crop in some localities, while in others it is only fair, and on the low lands where not well drained is only good for fodder. Oats are much the same as the corn crop, some good, but on the whole, light.

Timothy seed fairly good in quality and yield. Potatoes a light crop, on account of the wet season. Barley and flax crops are fairly good. Hay crop was excellent.

Stock of all kinds did well this season, owing to the exceptionally fine pasturage.

Fruit was of a good quality, although the yield was not up to the average of former years.

MUSCATINE COUNTY.

W. H. Shipman.

The annual meeting of the Union District Agricultural Society was held at West Liberty, August 18, 19, 20 and 21, 1903, and was a very successful fair financially and otherwise.

Corn at this date (October 24th) is in much better condition than was anticipated six weeks ago. The continued wet weather at time of planting made the corn crop look very discouraging, and by August 1st many fields were given up as lost, but a very favorable fall has made a change. We will have plenty of good corn, while there will be some that will be very poor.

Oats had a fair yield, but are light in weight, and altogether not a very profitable crop. Wet weather in the spring, and hot days at the wrong time are responsible for this.

There was very little wheat raised, but was of a good quality.

Hay and grass are in abundance. Pastures were never in better condition, and consequently all stock is in fine condition. Hay crop was very heavy, and of good quality. Clover and timothy hay is not raised to any great extent. There was a good yield of second crop clover.

All kinds of horses are raised, but more attention is being given to the breeding of good sized trotting and coach horses the past four or five years. Farmers are also breeding better draft horses.

The breeding of cattle for beef purposes has been given the most attention, but recently the demand for good breeding cows that are good milkers has been growing, owing to the Iowa Condensed Milk Company having located a plant at this place. They will pay $1.40 per hundred for milk during the winter months, and many farmers think it a profitable price. The company is organized with local capital amounting to $75,000.

All breeds of hogs are raised, among which very little sickness has been reported the past year.

MONTGOMERY COUNTY.

D. B. Gunn.

The annual exhibition of the Montgomery County Agricultural Society was held at Red Oak, August 17, 18, 19 and 20, 1903, and was a success in every respect.

Crops in this county were somewhat backward, as was true throughout the State, owing to the excessive rains. Corn at this writing (October 6th) is at least three weeks behind the ordinary season, but with favorable weather much of it will mature. There will be a great deal of soft corn, and the yield in general will be lighter than any year since 1884. Will probably not average more than sixty-five per cent of the usual crop.

Small grain was about the average crop, but was considerably damaged by rains after being harvested, and that which was stacked and not threshed as yet is growing badly.

Hay was an exceptionally large crop, and being favored with good weather at cutting time was put up in splendid condition.

Stock has done fairly well, owing to the good pasturage. Disease is breaking out among hogs quite badly, and reports are coming in that cattle are troubled, as they were last year, with Black Scours or Bovine Cholera, as it was usually pronounced. We anticipate much trouble in this respect on account of the very wet condition of the grass and grains, especially corn and fodder, it being damp and sour, thus producing an acid condition that gives very disastrous results to stock, especially hogs and young cattle, with a few cases among feeders.

As a whole we have had a fair average in production, and as the price on all commodities is fairly good, prosperity seems assured to the industrious tiller of the soil.

MAHASKA COUNTY.

Ed Pritchett.

Fair held at Oskalaosa, September 8, 9, 10 and 11, 1903.

Following is a summary of crop conditions in this county this season:

Oats: About one half the average crop, and of a poor quality.

Corn: Average about two thirds of usual crop.

Grass and pasturage: An abundant crop, and generally was put up in good condition.

MAHASKA COUNTY.

N. D. Bates.

Fair held at New Sharon, September 16, 17 and 18, 1903.

We had one of the best fairs held here in several years. While the attendance was small on account of the prevailing bad weather, the exhibits in all departments were fine, especially the display of cattle. There were complete herds of the leading breeds that would do credit to any show ring.

The display of agricultural products while good was somewhat limited on account of the late season.

The corn crop in this locality, while not up to the average of former years, on account of the late and wet spring, is better than was expected; will probably average fifty per cent of a crop. The lateness of frost this fall has helped to mature corn that would have been otherwise soft. The small grain was not as good a crop as usual, owing to the unfavorable season.

Hay and pasturage was never better, the hay crop being an enormous one for this locality.

MADISON COUNTY.

T. J. Hudson.

Fair held at Winterset, September 16, 17, 18 and 19, 1903.

Considering the unpromising weather, the fair was a success. By a few days postponement more favorable weather was secured, but the continual rain preceding and including the first day of the fair materially interfered with the attendance and exhibits.

The cattle department was well filled, and in the horse department few draft horses were shown, but in the standard breed trotter and roadster classes some fine animals were exhibited.

Many fine hogs were shown, comprising principally the Chester White, Poland China and Duroc Jersey.

Owing to the unfavorable season all crops were retarded in early planting and maturing. Hay, however, was an exceptionally good crop, while oats and other small grains were light, both in yield and quality. Corn at this writing (September 23d) is maturing rapidly, and will yield a two thirds crop.

Land values range from $50 to $100 per acre.

MARION COUNTY.

Chas. Porter.

Fair held at Pella, September 29 and 30 and October 1 and 2. 1903.

The fair was a very successful one, taking into consideration that we had but one day of favorable weather, as all departments were well filled, and the gate receipts were more than the management expected under the unfavorable weather conditions.

In the stock classes the showing far surpassed all previous exhibits, and especially was this true in the showing made of draft horses. We still claim the best poultry show made at any county fair in the State.

Our crops were harvested mostly in good shape. Pasturage has been excellent throughout the season, and all live stock is in good condition.

Farmers in this vicinity have been very sucessful the past two seasons, with good crops of corn and no hog cholera. In every pasture a good crop of shoats may now be seen.

Our farmers are using cream separators and are paying more attention to the dairy industry, which means more diversified farming. and this, in the opinion of the writer, depends the success of our farmers in the future, as land has enhanced in value until we must derive, if possible, more and greater returns from each acre, and good stock will also be a redeeming feature.

MILLS COUNTY.

I. J. Swain.

Fair held at Malvern, September 1, 2 and 3, 1903.

Agricultural conditions in this county, while in a degree satisfactory, are still somewhat below the average, no crop being above. The wheat crop appears to be nearest the average of former years, while oats and corn are not so good. Apples and all small fruit were a disappointment, and peaches and potatoes were practically a failure. It is doubtful if there is enough potatoes for home consumption. Rye, flax, buckwheat and sorgum are not grown to any great extent. and can hardly be considered a part of the agricultural interests of this county.

The outlook for the corn crop at this writing (September 28th), taking into consideration the acreage planted, will not yield more than a half crop of sound merchantable grain. Even barring killing frosts before October 15th to 20th the late planted corn will be unmatured and under value.

Grass on the uplands yielded above the average, but the general yield is much reduced, owing to lands lying low and not well drained being flooded a greater part of the season.

Taken as a whole the crop yield will undoubtedly fall below the average, yet. there will be a considerable surplus for the market, and at present prices, or even slightly lower, the average income per acre will not be much below former years.

There is no disease reported among animals of the various classes, even the divesting swine plague, so often prevalent, being conspicuous by its absence.

Improved breeding of all classes of farm animals has been conducted for the past thirty years, and gratifying results are shown in the magnificent specimens of all breeds of horses, cattle and swine, to be found on a majority of the farms in this county.

Hundreds of horses are sold annually for the eastern and southern markets, at prices which render it profitable to the producer. Thousands of cattle and hogs are annually produced, fed and shipped, the income from which goes far toward maintaining the steady improvement of the farms and villages of the country. Under such circumstances notwithstanding the apparently unfavorable results of the year, our people are happy, contented and prosperous, and feel a justifiable pride in extending an invitation to others to locate within their borders.

MUSCATINE COUNTY.

W. A. Cooling.

Fair held at Wilton Junction, September 9, 10 and 11, 1903, after postponement of one day on account of rain.

On account of the unfavorable weather the attendance was somewhat curtailed; however, the fair on a whole was the must successful one ever held by this association. The exhibits in every department were large, and of a high class, and the races close and exciting, leaving our outlook for next year most promising.

Crops in this vicinity were on a whole very satisfactory. Corn has ripened rapidly the past three weeks and the yield will be about the average. In spots, of course, there will be some soft corn, but generally speaking we can call corn a first-class crop.

There was a good yield of oats, but were of a poor quality. Barley first class, in both quality and yield.

PAGE COUNTY.

C. E. Young.

Fair held at Shenandoah, August 12 and 13, 1903.

The fair was a success financially and otherwise.

Agricultural conditions in this county are good, the yield being much better than at first anticipated. Small grain was good both in quality and yield. Potatoes are rough, but selling at $1 per bushel. Corn is an average with former years, both in quality and yield.

PALO ALTO COUNTY.

P. V. Hand.

Fair held at Emmetsburg, August 18, 19, 20 and 21, 1903.

With regard to the amounts of agricultural exhibits at our fair, they were not as good as we would have liked to have seen, but owing to our early dates were all that could be expected. Furthermore, the weather was very bad, and the roads in some parts of the county almost impassable, making it impossible for some farmers to bring in their exhibits, so that the display in this department would be no criterion as to the general condition of crops in the county.

Corn, our principal crop, is about the average in quality with former years, but acreage is short, owing to the wet condition of the land in the spring causing late planting. Some of the corn will be soft, but the bulk of the crop, however, is well matured, the lateness of killing frosts being a great help to it.

The oat crop was as good as the average, but some are light in weight. Potatoes were above the average, both in yield and quality. Pasturage this season was of the very best, and the dairy interests in the county, which are very extensive, reaped a rich harvest. The writer is treasurer of the creamery at this place (Emmetsburg) and we have paid to the farmers for milk each month since May an average of $5,000.

The apple crop was more than an average, both in quality and quantity, but were mostly of early varieties.

There has been no epidemic of hog disease this year, and taking everything into consideration, I would say that the farmers of this county are in a prosperous condition.

POTTAWATTAMIE COUNTY.

Caleb Smith.

Fair held at Avoca, September 8, 9, 10 and 11, 1903.

As far as the entries and exhibits were concerned the fair was a success, all departments being well filled, with the exception of horses.

The management was compelled to double the capacity of the hog pens, and add a third more to the cattle barns, and with these additions there were a number of exhibitors who could not be accommodated with pens or stalls.

A large amount of credit is due to the ladies of this county in filling the floral hall with their handiwork in domestic, ornamental and fine arts. The weather was a dismal failure, as it rained or threatened to rain every day of the fair but one, and on that day the attendance was good.

Crops in this county are about an average with former years. Small grain was damaged to some extent by excessive rains. Corn on the lowlands was almost a failure, on account of it being planted late, and too wet to cultivate. Potatoes were a light yield, and some rotting in the ground. Hay was in abundance, but somewhat damaged by rain. Stock of all kind is in good condition. Hogs are plentiful, and no cholera is reported in this vicinity.

POWESHIEK COUNTY.

James Nowak.

Fair held at Molcolm, September 7 to 12, 1903.

Rain prevailed throughout the days of tne fair, and the attendance was not as large as in former years, when only a three days' fair was held. From point of exhibits the fair was a success, every department being well filled. However, receipts were sufficient to pay all bills and premiums in full.

Owing to the exceedingly wet spring, corn was late in being planted. and some of it will be soft and unmarketable, but the yield is good and 7 per cent of it is of fair quality.

Wheat, barley and oats were of an average yield and quality. Apples, peaches and other fruits fairly good. Potatoes were about 80 per cent of the average crop, but of extra good quality.

Horses and cattle are bringing good prices. Hogs are free from disease, and are also bringing good prices. Sheep are in good demand. Poultry and dairy industries are profitable ones to the farmer.

Good farming lands are bringing from $60 to $125 per acre.

Nearly every farm house in this county has telephone service and rural free delivery mail service.

POWESHIEK COUNTY.

C. H. Verbeck.

Fair held at Grinnell, September 1, 2, 3 and 4, 1903.

The season has not been a profitable one for the farmers of this county, it having been cold and wet. Corn planted early and on high ground has done very well, owing to the fact that frosts have held off so late, there having been no killing frosts up to this date (October 5th). Late planted corn, and all corn on low land, will not mature, and there will be a good deal of soft corn, but the yield will be much better than at first anticipated.

Oats, by reason of much wet weather, grew rank straw, and the grain is of light weight and not of good quality.

Potatoes, except late planted, are not an average with former years, in quality or yield.

Hay was an exceptionally large crop, and was generally put up in good condition. Pasturage is good and live stock of all kinds is in excellent condition.

RINGGOLD COUNTY.

Thos. Campbell.

Fair held at Mount Ayr, September 1, 2, 3 and 4, 1903.

We were favored with fine weather throughout the days of the fair, and the attendance was exceptionally good. All those attending pronounced it the best exhibition ever had by the society. We made special effort on the county exhibits, and our barns were well filled, with more room in demand than we could supply. The cattle, swine and sheep exhibits were in quality equal to any shown at the State Fair, and in fact they were a part of the herds shown there. The agricultural exhibit was a credit to the production of any year, and all other departments were filled to overflowing. The outlook for an exceptionally good fair in 1904 was never better.

The crops of this county were materially damaged by the continued cold and wet weather, and at this writing (October 9th) we are assured of but little in excess of a half crop.

All grain is high in price, and in consequence there will not be the usual amount of cattle fed for the market.

The hay crop was an exceptionally large one, but was damaged to some extent in stack by the heavy rains. Fall pasture was never better, and we have plenty of everything to take us through the winter in good shape.

Land values are about the same as last year, ranging from $35 to $60 per acre.

SAC COUNTY.

Frank V. Healy.

Fair held at Sac City, August 11, 12, 13 and 14, 1903.

Although the weather was very unfavorable throughout the days of the fair, all departments were well filled, and the attendance was fairly good.

The society's grounds are very pleasantly situated and well equipped, being well piped, with hydrants from a spring on the grounds, and lighted with electric lights from the city plant. The fruit exhibit was the best ever had in the history of the association, and there was a fine field of trotting and pacing horses. The fact that we always offer large purses, pay every winner in gold at the wire, have the very best accommodations, and a track second to no half mile track in the State, brings all the good ones each year, and we find that good racing, in addition to the good agricultural exhibit, brings large crowds and pleases the people.

Horses: The farmers are taking more interest in the raising of horses and improving their stock, and there are some pure bred draft sires being brought into this county, the Percheron being preferred, as they sell at one or two years younger than some of the other draft breeds. Some very good trotting stock is bred, but not so much interest is taken as in the breeding of the heavier stock. There is no disease among horses, but barbed wire has ruined many of our promising colts.

Cattle: Considerable interest is being taken in the breeding of thoroughbreds, and at our annual fair an improvement was quite noticeable. The Holsteins and Jerseys have few friends, Shorthorn, Angus and Herefords being preferred. Beef cattle are commanding a fair price, and cows for dairy purposes are selling at from $25 to $35. Principal market, Chicago. Cattle are generally healthy in this locality.

Sheep: This industry is being revived, and numerous small flocks can be seen. The Shropshires are preferred, and are selling at good prices and generally healthy.

Swine: The Poland China is probably the leader, although a few fine herds of Berkshires and Duroc Jerseys are to be seen. The pig crop was up to the average, and all the available space in the swine department at the fair was filled with good specimens of all breeds. No disease is reported among hogs in this locality.

SHELBY COUNTY.

W. E. Cooper.

Fair held at Harlan, September 15, 16, 17 and 18, 1903.

Owing to the excessive rainfall on Tuesday, September 14th, and the threatening weather the following day, prevented this from being the most successful fair held by our association.

The exhibits of fine stock excelled our usual good display, and the attendance, considering the weather, was all that could be desired.

The problem that confronts our association,—and presumably others,—is, how to secure good horses and plenty of them for the speed ring. While our showing in that line was not such as we desired to have, it was as good as our adjoining associations.

Our display of agricultural products was better than any previous year, as was the display in the floral hall. We feel that our people are becoming more interested in the "County Fair" each succeeding year.

The general condition of the stock on the farms is good, there being no contagious diseases reported in this county.

The hay crop was all that could be desired, both in quality and quantity, and was harvested in good condition.

Small grain was not as good as usual, owing to the wet season. The yield was up to the average, but the quality was not so good.

The corn crop will be a fair average, both in yield and quality, with former years.

The potato crop was a failure, owing to excessive rainfall.

The usual number of cattle will be put on feed this fall.

The pig crop in this locality is above the average, and are in a healthy condition. A noticeable feature at our fair was the improvement in both numbers and quality of the stock on exhibition. Several local herds were exhibited at the fair for the first time, which is a sure indication of the advancement of stock breeding.

SIOUX COUNTY.

James Wallpole.

Fair held at Rock Valley, September 9, 10 and 11, 1903.

Very unfavorable weather prevailed throughout the days of the fair. The first day threatening weather kept many at home, but the second day the attendance was good, and on the last day, owing to rain, the fair was abandoned.

Exhibits in all departments were the best in the history of the society, all pens and stalls being filled, and we could not accommodate all those who wished to make exhibits in Floral Hall, for want of room.

The excessive rains the past season in this county were very unfavorable to crops. The wheat crop was about the average, and early oats were good, yielding about fifty bushels per acre. Late oats were poor, both in yield and quality. Corn at this writing (September 15th) is practically safe from damage by frost, and will make a fair crop.

The potato crop was not an average of former years in yield, and are rotting to some extent.

There is a marked improvement in the quality of all stock bred in this county, and all are in good condition.

Grass and hay crops of all kinds were exceptionally good this season, and especially alfalfa.

Land prices range from $70 to $90 per acre.

SIOUX COUNTY.

H. Slikkerveer.

Fair held at Orange City, September 16, 17 and 18, 1903.

The weather for two weeks previous to the fair was almost a continual rain, and prospects for our fair looked bad, but a couple of days before the date set for holding it the weather began to clear, and we had what we call a very successful fair, taking into consderation the weather, bad roads, and farmers being behind with their work.

There was a good exhibit in all stock departments, but that of farm products was not very large. The Art Hall made a very good showing, for which the ladies must have all the credit, they taking much interest in the display of fancy goods.

The attendance was very good. Good attractions were provided.

The crops this season, owing to excessive rains and unfavorable weather, are not up to the average of former years. Summer wheat was poor in quality, and yielded from eight to fifteen bushels per acre Oats were mostly very light, the early ones being of better quality and yield.

Corn gave promise of an enormous crop, but the wet weather and early frosts did considerable damage, and will only average about fifty per cent of a crop.

STORY COUNTY.

J. R. Larson.

Fair held at Nevada, September 9, 10 and 11, 1903.

The corn crop in this county will be about the average in yield. There will be some soft corn, but ninety per cent of the crop will be marketable. There are some spots where ground was low lying, especially along Skunk river, where all crops were drowned out during the high water in the spring, but our avreage and quality of corn is much better than is the average of the State.

The oat crop had a good yield, but quality poor, the grain being light and chaffy.

The hay crop was the largest on record, and the farmers were able to put most of it up in good shape. Threshing is nearly all done at this writing (October 7th), and fall plowing is well under way.

The farmers of this county are using more improved machinery than ever, and a better system of farming is gradually being adopted.

There is a growing interest being taken in the breeding of thoroughbred stock of all kinds, many farmers having started herds of pure breeds during the past two years.

The showing of hogs at the fair this year was better than ever before, while that of horses and cattle was about the average.

TAMA COUNTY.

A. G. Smith.

Fair held at Toledo, September 15, 16, 17 and 18, 1903.

The exhibits in all departments were lessened to some extent on account of rain. Tuesday and Wednesday, the first and second days of our fair, it rained, and the fair was extended to include Saturday.

The speed department was up to the average of former years, and the horse exhibit made a splendid showing. The exhibit of cattle, while not as large as usual, was a very creditable showing. Over two hundred head of swine were entered for premiums, and the art hall, as usual, was well filled, as was also the agricultural department.

Considering the wet weather we had, the board of directors of our society feel well satisfied with the fair. Premiums were paid in full. A special and interesting feature was the display of school work.

Oats are very good in this county, being favored wth good weather at harvest time. Hay was an exceptionally large crop. and generally put up in good condition. Potatoes were of a fair yield and quality. Pasturage being good, stock of all kinds is in excellent condition. Corn, while not as good as some years in the past, is, on the whole, better than last year. At this writing (October 5th) we have had no killing frosts.

TAYLOR COUNTY.

W. F. Evans.

Fair held at Bedford, October 14, 15 and 16, 1903.

On account of unfavorable weather the fair was postponed from dates originally set, September 15th, 16th, 17th and 18th, to the above dates, but the continued dates were anything but favorable for outdoor exercise, and the attendance was light.

The showing in most of the departments was excellent, and fully up to the standard, both in quality and quantity, of former years, although quite a number of fine stock raisers were prevented from making a showing of their favorites, on account of the almost impassable condition of the roads.

The fair was a success in every way except financially, the attendance being the smallest in the history of the society, owing very largely to the disagreeable weather and muddy roads.

Friday, October 15th, was "Educational Day," and all children under twelve years of age were admitted free on this day. Under the influence and untiring effort of our efficient county superintendent, Professor H. S. Ash, this day has become the big day of our fair. The school exhibit was a very interesting feature to all who attended, every school, whether rural or graded, had something on exhibition from every pupil who could write.

We exclude all games of chance, and find that our people, with small exception, highly approve of it.

Horses: There has been a general breeding up of the better grades, especially in draft. Percheron, Clydesdale and Norman are the leading breeds. There was 12.064 head assessed in this county for the year of 1903. at a value of $681,370. No disease reported. Prices range from $75 to $175, and in many cases individuals of extra quality bring $200. These, of course, are exceptionally heavy fellows, combining weight, color, style, etc.

Cattle: While the showing in this department was small, on account of bad roads and weather, the quality of those shown was fine, Herefords and Black Polled being the principal breeds exhibited. A number of Shorthorn breeders were prevented from exhibiting, owing to the above mentioned conditions. Cattle assessed, 37.904, valued at $830,843. No disease reported. Principal market, Chicago.

Sheep: Interest not growing as in other kinds of stock, although there are some very fine flocks in this county. Number assessed, 7,647, valued at $23,151. Present price, $3.50 per hundred. and sold mostly to local markets.

Swine: Poland China, Duroc-Jersey and Chester White are the leading breeds. No disease reported. A very large number of stockers on hand of extra fine quality. Although market at this time is much lower than at the beginning of the year, there is at present prices a good profit in feeding surplus corn at home to hogs rather than selling it to the elevators. Number assessed, 43,364, valued at $297,717. Marketed at Chicago, St. Joseph and Ottumwa.

Poultry: While the exhibit in this department at the fair was very light, the birds shown were of extra quality. There has been a noticeable increase in the amount of poultry raised in this county. Eggs are a source of wealth to the farmers' wives, and shipments are yearly on the increase. Poultry is better cared for than ever before, and better blood is plainly shown in all flocks. Barred, Buff and White Plymouth Rocks, Langshan and White Wyandottes are the leading varieties where meat and eggs combined is the object, while for eggs alone White and Brown Leghorns are the favorites.

Corn: That which was planted early on high ground is excellent in quantity and well matured. The unusually wet season drowned out all crops on the bottoms and lowlands. Yellow and White Dent are the leading varieties. At least ninety per cent of crop uninjured by frost.

Wheat: Very little was sown this season, and that which could be harvested was badly bleached by wet weather.

Oats: The usual acreage sown, but badly damaged by rust before cutting, and the continued heavy rains damaged it in shock, making yield unusually light and quality inferior.

Timothy: An exceptionally good crop, and generally put up in good condition.

Potatoes: Acreage planted below the average of former years, and yielded very light. Many rotted in ground before fully matured; not enough raised for home consumption.

Fruit: Apples not more than one fourth usual crop, and poor in quality. Peaches, pears, plums and all small fruits damaged by late frosts and heavy rains, and were almost a complete failure.

WINNESHIEK COUNTY.

H. L. Coffeen.

Fair held at Decorah, August 25, 26, 27 and 28, 1903.

Owing to it having rained every day of our fair, the gate receipts were not as much as we usually have.

The exhibits of cattle, swine and poultry were unusually good, and rainy weather was the only thing which prevented us from having a record-breaking fair.

Stock throughout the county is of a high grade, and it is a very unusual thing to find farmers who do not use thoroughbred sires of good quality, consequently the trend is upward.

The hay crop was unusually heavy, and was put up in good condition. About two thirds of the corn matured and made a fair crop, and will average about thirty bushels per acre. Other crops were about up to the average of former years.

There are unoccupied water powers on the upper Iowa river that furnish facilities for getting cheap power if needed by anyone who should read this report. There are about twenty creameries in this county, all doing well.

The natural groves of the county furnish timber enough for fuel, so that taken on a whole farmers in this county are generally in a prosperous condition.

WARREN COUNTY.

C. F. Moorman.

Fair held at Indianola, September 8, 9 and 10, 1903.

The fair was a success, financially and otherwise.

Owing to the exceptionally wet season the planting of corn and small grain was very much retarded, but the yield on high and well drained land is a good average with former years. Fruits and vegetables were plentiful, and of good quality.

Thoroughbred stock of all kind is raised extensively in this county, and the improvement in horses and cattle is quite noticeable. In cattle, Shorthorn and Polled Angus are the preferred breeds.

Hogs made an exceptionally large showing at our fair, and of the best breeds.

Sheep are not very extensively raised in this county, but those raised are of fine quality. Shropshire breed mostly in evidence.

Poultry is extensively raised, and much interest is taken in the breeding of the best meat and egg producing varieties.

WINNEBAGO COUNTY.

J. Woodcock.

Fair held at Buffalo Center, September 9 and 10, 1903.

The crops in this county, as in all northern Iowa, suffered a great deal from excessive rainfall and cold unfavorable weather. The acreage of wheat sown would probably not exceed fifty per cent of that of last year, and the yield was light, ranging from ten to twelve bushels per acre, of third grade. Will all be used for home consumption.

The oat crop in acreage was about eighty per cent of that of last year, yielding from eighteen to forty bushels per acre, and weighing from nineteen to twenty-six pounds to the measured bushel.

Corn will average about eighty-five per cent of the acreage of last year, but ten per cent of this will yield no crop, owing to land lying low and flooded. Yield will average thirty bushels per acre.

Very little flax and buckwheat raised in this section.

The hay crop was an exceptionally large one, and pasturage has been good all season.

Potatoes will average only about twenty-five per cent of the usual crop, wet weather causing them to rot to a great extent while in the ground.

All kinds of stock are in fine condition, owing to the abundance of pasture and fall feed.

Fruit was a good crop both in quality and yield.

WORTH COUNTY.

Bert Hamilton.

Fair held at Northwood, September 17, 18 and 19, 1903.

Threatening weather just prior to the dates of the fair discouraged many who would have become exhibitors, and the almost impassable condition of the roads prevented many from being able to haul their produce to town, and the poor crops made others feel too poor to spend either time or money necessary to attend the fair, and the consequence was rather a poor showing.

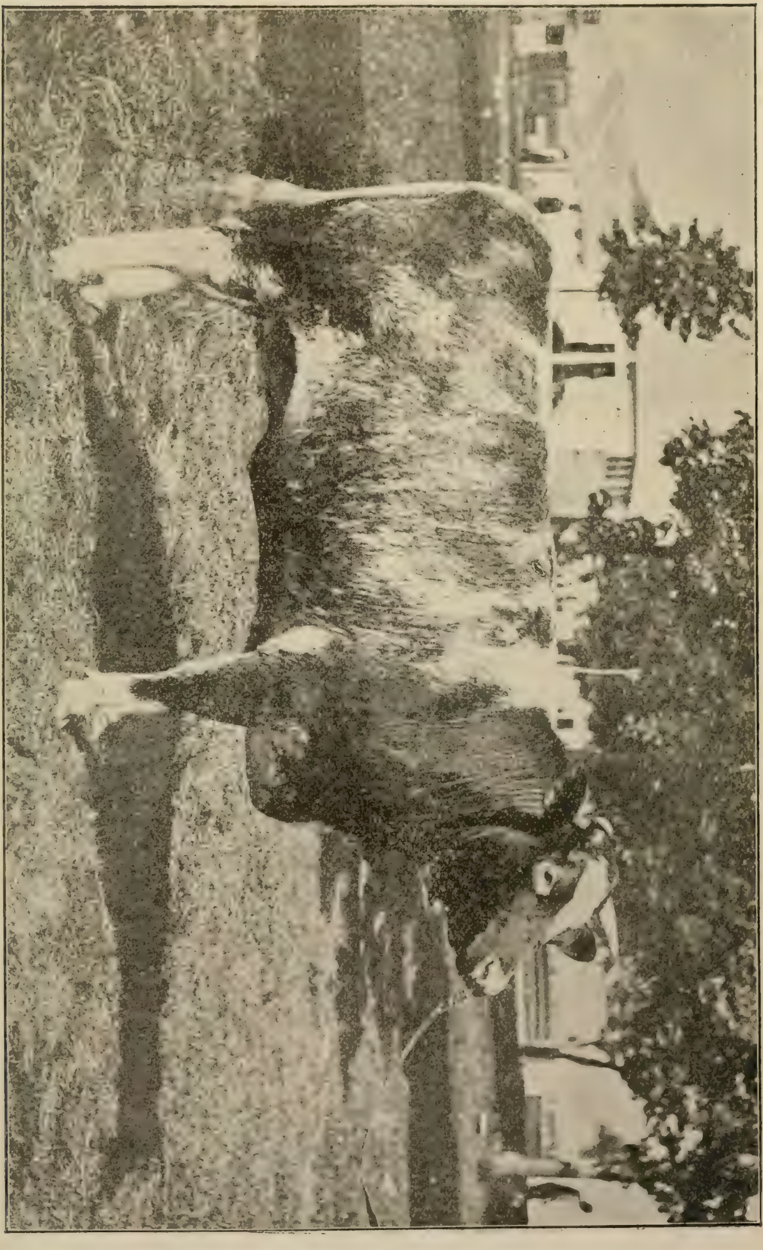
In the live stock departments there were few exhibits, as it was almost impossible to drive or haul stock to the fair grounds, on account of the muddy roads, but the few specimens present were as good as the county affords.

In farm products there was a good show, considering the wet season and unfavorable conditions for harvesting crops. Splendid specimens of all kinds of small grain were shown, and many samples of corn were exhibited.

In fruits the display was better than usual, and the same may be said of vegetables. Worth county is getting to be a great fruit raising section, and many of the farmers have splendid orchards that are becoming sources of profit to them.

In the ladies' department there was an unusually large display of fancy work and useful and beautiful articles.

Our society does not spend much money for horse racing, as most of the fair attendants do not care for that kind of sport. A few good horses were here, and the races good.



One of the prize winners at the Iowa State Fair of 1903.

FINANCIAL STATEMENT OF COUNTY AND DISTRICT FAIRS, 1903.

County or District.	Receipts.				Disbursements.					
	Balance on hand December 1, 1902.	Receipts for 1903.	Overdrafts for 1903.	Total receipts for 1903.	Expenses for 1903.	Speed premiums paid for 1903.	Premiums paid for 1903.	Balance on hand November 1, 1903.	Total disbursements for 1903.	Indebtedness for 1903.
Adair	$ 4.72	$ 2,540.48		$ 2,545.20	$ 1,208.47	$ 380.00	$ 789.25	$ 167.48	$ 2,545.20	$ 1,250.00
Adams	109.24	3,065.28	$ 1,537.23	4,711.75	2,351.75	1,617.50	742.50		4,711.75	1,537.23
Allamakee		3,003.33	1,201.00	4,204.33	2,676.28	696.05	832.00		4,204.33	3,701.00
Audubon	318.00	3,062.70		3,380.70	1,542.59	1,135.00	684.40	18.71	3,380.70	700.00
Benton	54.44	2,415.53	666.53	3,136.50	1,549.25	801.50	785.75		3,136.50	1,200.00
Boone		1,051.02		1,051.02	360.00	275.00	415.05	.97	1,051.02	500.00
Buchanan	689.21	2,367.33		3,056.54	1,665.01	249.25	583.75	558.53	3,056.54	3,600.00
Buena Vista		4,869.72		4,869.72	1,693.38	2,234.85	837.25	104.24	4,869.72	
Black Hawk—La Porte City district		2,290.80		2,290.80	882.38	782.50	455.25	170.67	2,290.80	1,800.00
Cedar—Tipton district		3,082.30	517.91	3,600.21	2,192.71	532.00	875.50		3,600.21	518.21
Chickasaw—Big 4 district	41.78	2,762.60		2,804.38	990.68	755.00	850.00	208.70	2,804.38	2,100.00
Clayton	43.58	2,702.75		2,746.33	1,385.15	586.25	584.65	190.28	2,746.33	300.00
Clayton—Strawberry Point district	7.18	2,598.44		2,605.62	1,122.00	810.00	584.00	89.62	2,605.62	2,150.00
Clayton—Elkader district		2,363.50	684.89	3,048.39	1,630.24	625.00	743.15		3,048.39	4,563.00
Clinton	71.75	4,093.00		4,164.75	1,871.82	787.00	1,115.50	390.43	4,164.75	
Clinton—Clinton district	613.68	5,709.10	201.00	6,523.78	3,073.13	2,300.00	1,150.65		6,523.78	201.00
Dallas		1,761.50		1,761.50	1,058.34	102.50	400.66	200.00	1,761.50	500.00
Davis		3,346.10		3,346.10	1,567.25	852.50	926.35		3,346.10	180.00
Delaware		2,111.25		2,111.25	963.69	565.25	462.02	120.29	2,111.25	2,172.75
Fayette		3,250.85		3,250.85	1,900.00	655.00	649.25	46.60	3,250.85	2,000.00
Franklin	114.31	3,772.08	854.55	4,740.94	3,493.70	592.00	655.24		4,740.94	1,350.00
Grundy	290.33	1,574.36		1,864.69	750.05	205.00	440.50	469.14	1,864.69	580.00
Guthrie		2,418.87		2,418.87	1,089.21	555.00	641.00	133.66	2,418.87	1,200.00
Hancock		1,470.38	286.67	2,044.29	660.09	1,067.50	316.70		2,044.29	1,375.00
Hardin	305.56	6,829.66	186.67	7,421.89	3,712.84	2,725.00	984.05		7,421.89	500.00
Henry	55.02	6,700.46		6,755.48	3,015.73	2,020.00	1,176.40	543.35	6,755.48	1,200.00
Henry—Eastern Iowa district	25.16	3,794.15		3,819.31	868.81	1,775.00	1,071.05	104.45	3,819.31	3,200.00

Humboldt		1,467.93	34.59	1,502.52	757.27	287.50	457.75		1,502.52	757.00
Iowa—Williamsburg district		2,042.00	767.28	2,809.28	1,265.00	980.00	564.28		2,809.28	2,575.00
Jackson	532.00	4,668.00		5,200.00	2,400.00	1,700.00	857.20	242.80	5,200.00	300.00
Jasper	230.99	3,377.51		3,608.50	1,452.50	1,202.00	854.00	100.00	3,608.50	2,400.00
Jefferson	137.92	2,152.20	13.51	2,303.63	613.83	744.00	945.80		2,303.63	600.00
Johnson		4,864.77	165.42	5,030.19	2,363.19	1,498.75	1,168.25		5,030.19	3,200.00
Jones	465.00	3,660.00		4,125.00	1,682.00	1,000.00	1,145.00	298.00	4,125.00	
Jones—Anamosa district	143.53	7,804.21		7,947.74	5,965.43	1,310.00	568.30	104.01	7,947.74	
Keokuk—What Cheer district		3,987.20		3,987.20	1,661.20	1,575.00	551.00	200.00	3,987.20	1,500.00
Kossuth	35.55	1,390.60		1,926.15	633.12	110.00	598.25	584.78	1,926.15	1,600.00
Linn—Marion district	2.76	11,375.80		11,378.56	4,325.64	6,375.00	652.21	25.71	11,378.56	6,150.00
Linn—Wapsie Valley district	194.07	4,031.65	133.00	4,358.72	2,734.72	635.00	989.00		4,358.72	1,750.00
Linn—Prairie Valley district	26.79	2,289.70	53.46	2,369.95	827.80	942.25	599.90		2,360.95	1,505.00
Lee	723.02	1,898.90		2,621.92	870.45	752.50	527.70	471.27	2,621.92	
Louisa—Columbus Junction district	261.50	7,573.85		7,835.35	1,891.36	3,600.00	2,046.25	297.74	7,835.35	2,600.00
Louisa—Wapello district	5,000.00	1,811.64		6,811.64	4,245.41	850.00	685.25	1,030.98	5,780.66	1,407.61
Lucas		1,020.50	243.03	1,254.53	270.46	480.51	503.56		1,254.53	1,170.00
Mahaska		1,230.00	788.15	2,018.15	820.00	580.00	618.15		2,018.15	8,000.00
Mahaska—New Sharon district	8.48	1,370.20		1,378.68	302.55	680.00	300.50	95.63	1,378.68	1,050.00
Marion—Lake Prairie district	51.51	1,716.42	41.76	1,809.69	872.59	220.00	717.10		1,809.69	41.76
Mitchell	7.56	1,753.21		1,760.77	871.39	377.25	474.50	37.63	1,760.77	880.00
Montgomery	279.90	3,951.90		4,231.80	1,943.07	1,525.00	635.25	128.48	4,231.80	2,400.00
Muscatine—Union district	103.22	4,012.45		4,115.67	1,290.99	1,335.00	1,312.00	177.68	4,115.67	
Muscatine—Wilton district		1,850.30	424.73	2,275.03	832.78	1,005.00	437.25		2,275.03	600.00
Mills	437.90	1,856.15		2,294.05	1,004.40	470.00	595.05	224.60	2,294.05	
Madison		1,866.50	441.57	2,308.07	723.12	1,125.00	459.95		2,308.07	900.00
Page—Shenandoah district	835.71	5,032.98		5,868.69	2,469.86	1,610.00	775.10	1,013.73	5,868.69	
Palo Alto		2,758.40		2,758.40	885.90	1,590.00	282.50		2,758.40	960.00
Poweshiek—Central at Malcom	569.40	1,977.15		2,546.55	945.03	747.45	787.00	67.07	2,546.55	400.00
Poweshiek—Central at Grinnell	.27	2,830.77		2,831.04	1,224.72	1,040.00	564.70	1.62	2,831.04	3,875.00
Pottawattamie	55.10	3,429.98	16.75	3,501.83	2,064.43	666.47	770.93		3,501.83	1,350.00
Ringgold		2,702.48		2,702.48	1,241.63	600.00	860.85		2,702.48	1,800.00
Sac		5,065.41		5,065.41	2,702.16	1,183.75	700.50	479.00	5,065.41	3,247.00
Shelby		2,158.75	335.70	2,494.45	936.75	701.25	856.45		2,494.45	335.70
Story	61.81	1,716.75	234.79	2,013.35	1,081.49	375.00	556.86		2,013.35	2,400.00
Sioux	6.15	1,312.55		1,318.70	742.12	174.50	400.05	2.03	1,318.70	500.00
Sioux—Rock Valley district		1,889.79	470.56	2,360.35	640.00	1,200.00	520.35		2,360.35	1,500.00
Tama		3,365.68		3,365.68	1,910.38	821.00	622.80	11.50	3,365.68	600.00
Taylor	55.71	1,517.70		1,573.41	867.77	161.20	461.59	82.85	1,573.41	
Warren		2,615.15	936.52	3,551.67	1,288.22	1,327.70	935.75		3,551.67	6,000.00
Winneshiek	640.64	2,504.05		3,144.69	1,690.47	352.25	545.24	556.73	3,144.69	1,000.00
Wright		1,077.45	96.19	1,173.64	741.39	97.50	334.75		1,173.64	
Winnebago—Buffalo Center district	18.17	962.48		980.65	350.27	268.00	215.00	147.38	980.65	1,454.00
Worth		881.70	16.90	898.60	311.10	220.00	367.50		898.60	900.00
Total	$13,628.62	$220,270.88	$11,728.60	$245,627.60	$112,3[illegible]0.15	$72,067.48	$50,410.49	$10,839.48	$244,596.62	$105,886.26

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